

BANISTERIA

A JOURNAL DEVOTED TO THE NATURAL HISTORY OF VIRGINIA



Laphria thoracica Fabricius

This bumble bee mimic is one of more than 100 species of robber flies known to inhabit Virginia, as discussed in the lead article of this issue.

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Editorial Staff: Banisteria

Editor

Steven M. Roble
Virginia Department of Conservation and Recreation
Division of Natural Heritage
217 Governor Street, Richmond, Virginia 23219

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Alfred G. Wheeler, Jr., Department of Entomology
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Thomas F. Weiboldt, Department of Biology
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Back cover: Climbing Dogbane (Trachelospermum difforme); original illustration by John Banister (1650-1692).
Figure 68 in folio in Hans Sloane's MS 4002 in the British Museum of Natural History.

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Number 36, 2010

A Preliminary List of the Robber Flies (Diptera: Asilidae) of Virginia Paul Bedell.....	3
Ground Beetles from the Quantico Marine Corps Base: 2. Thirty Additional Species from Recent Collections (Coleoptera: Carabidae) Richard L. Hoffman.....	20
Records of Butterflies and Skippers from Fort A. P. Hill and Vicinity, Caroline County, Virginia Anne C. Chazal, Steven M. Roble, and Christopher S. Hobson	25
Purse-web Spiders, Genus <i>Sphodros</i> , in Virginia (Mygalomorphae: Atypidae) Richard L. Hoffman.....	31
 Shorter Contributions	
Late Ground Nesting of Mourning Dove (<i>Zenaida macroura</i>) on Assateague Island, Virginia Gary R. Graves	39
<i>Geocoris uliginosus</i> , a Bigeyed Bug (Hemiptera: Lygaeoidea: Geocoridae) Associated with <i>Phlox subulata</i> in Mid-Appalachian Shale Barrens A. G. Wheeler.....	40
<i>Ecitoxenidia brevicornis</i> Seevers, a Rare Myrmecophilous Beetle, Occurs in Virginia (Coleoptera: Staphylinidae: Aleocharinae: Lomechusini) Richard L. Hoffman.....	43
The Tailed Cellar Spider, <i>Crossopriza lyoni</i> (Blackwall 1867), New to Virginia (Araneae: Pholcidae) Travis Clark and William A. Shear.....	45
 Historical Contributions	
Some Observations Concerning Insects Made by Mr. John Banister in Virginia, A.D. 1680	46
 Miscellanea	
Reviews	47
Reports.....	51
Announcements	53

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A Preliminary List of the Robber Flies (Diptera: Asilidae) of Virginia

Paul Bedell

10120 Silverleaf Terrace
Richmond, Virginia 23236
pbedell@verizon.net

“Robber-flies are among the most fascinating of all flies, except presumably to other small insects that are about to be snapped up by them.” Harold Oldroyd (1964)

ABSTRACT

One hundred fifteen species of Asilidae are listed for Virginia based on personal collecting, literature records, and museum specimens. Eleven additional species are considered possible for a total of 126. Four species (*Ceraturgus mitchelli* Brimley, *Cyrtopogon laphriformis* Curran, *Holopogon oriens* Martin, and *Lasiopogon appalachensis* Cannings) are recorded for the first time from the state.

Key words: Asilidae, Diptera, robber flies, Virginia, distribution, phenology.

INTRODUCTION

The Asilidae, commonly known as robber flies, are a fascinating family of predaceous Diptera. They are worldwide in occurrence and number over 7,000 species, with over 1,000 species in North America (Geller-Grimm, 2009). Robber flies are most common in open, arid habitats, and in North America are most abundant and speciose in the southwestern states and California. In deciduous-forested Virginia, Asilidae are often sparse in occurrence, but a number of species are widespread and common, and an important part of the state's fauna. Some species, such as *Ceraturgus aurulentus* (Fabricius), are apparently very rare throughout their range and beg for more attention in taxonomic surveys and state rare species lists.

Adult robber flies prey opportunistically on other flying insects by waiting on an exposed perch such as a leaf, rock, tip of a twig, or the ground surface (Fig. 1), and capture insects while in flight. An exception to this method is the small and delicate Leptogastrinae, which search amidst thick vegetation for perched insects such as mosquitoes, and may roost on the underside of a leaf (Fig. 1). As befits a visual predator, the eyes of Asilidae are large and separated for triangulation, and the antennae are reduced. Prey is injected with powerful toxins that both kill and liquefy the insides of the prey, which are then sucked out. Robber flies are entirely

harmless to people, neither biting nor serving as vectors of disease. An excellent and highly readable overview of the family Asilidae and its relationship in the order Diptera can be found in the classic book *The Natural History of Flies* by Oldroyd (1964).

The history of the description of Asilidae in Virginia can be traced back to John Banister, who illustrated a robber fly as “*Musca Lupus*” in the late 1600s. This drawing is reproduced as figure 63 in Ewan & Ewan (1970). *Musca lupus* can be aptly translated as “wolf fly.” Several species have historically been described from Virginia including *Laphria virginica* (Banks), *Machimus autumnalis* (Banks), *M. virginicus* (Banks), and *Megaphorus clausicellus* (Macquart); and more recently *Efferia kondratieffi* Bullington & Lavigne and *Lasiopogon marshalli* Cannings. However, no state list of Asilidae has been published for Virginia. The nearest regional summary concerns the fauna of Washington, D.C. (McAtee & Banks, 1920) and includes a key and annotated list of 83 species. Many of these records are from the Potomac Gorge area of Maryland and Virginia just west of Washington, and from Arlington and Fairfax counties in northern Virginia. A study of three sites in Maryland provides excellent ecological information for 37 species (Scarborough, 1974). A recent comprehensive list of 131 species of robber flies from Arkansas (Barnes et al., 2007) provides a good basis to which to compare the



Fig. 1. Representative robber flies of Virginia (not to scale). Left, top to bottom: *Laphria thoracica* Fabricius; *Promachus bastardii* (Macquart); *Nicocles pictus* (Loew). Right, top/bottom: *Diogmites neoternatus* (Bromley), with Hymenoptera prey; *Leptogaster brevicornis* Loew. (All photos by Paul Bedell except top right by Steve Roble).

Virginia fauna.

Two older state publications with good natural history information, and which overlap to a large extent with the Virginia fauna, are from Connecticut (Bromley, 1946) and Michigan (Baker & Fischer, 1975). More recently, several websites have greatly assisted the identification and occurrence of robber flies in the eastern United States (e.g., Beaton, 2009; Raney, 2010).

The abundance of many species of Asilidae in Virginia is unknown or conjectural. If a species was apparently common and widespread in my limited experience, I have noted such in the text. However, many species are represented by few records, either published and/or from museum specimens. Whether this represents true rarity, or just a lack of knowledge of their habitat and phenology, combined with little field effort, is unknown. Much remains to be learned about the Virginia fauna. In contrast to other insect groups such as butterflies (Lepidoptera) or dragonflies and damselflies (Odonata), robber flies do not appear on state or federal lists of threatened and endangered species. This is due to a substantial lack of knowledge. This paper is an initial attempt to delineate their distribution and occurrence in Virginia.

METHODS

I obtained records from three sources: published literature, museum specimens, and personal collecting. I collected specimens opportunistically from 2005-2010 with an aerial net, preserved them by freezing or placing in a collecting jar with ethyl acetate, and pinned each specimen. Survey locations were determined by work, family, or various natural history outings rather than any systematic attempt to cover geography and habitats. Additional specimens (ca. 500) were collected (some in Malaise traps) incidental to other insect surveys by staff of the Virginia Department of Conservation and Recreation, Division of Natural Heritage. Identifications were determined by keying specimens using published papers, painstakingly accumulated and often many decades old, for each genus.

As a starting point, a preliminary state list for Virginia was compiled based on the range information in Fisher & Wilcox (1997), the searchable species distribution on the website of Geller-Grimm (2009), and the paper by McAtee & Banks (1920).

Specimens were examined in collections of the Museum of Comparative Zoology at Harvard University (MCZ), National Museum of Natural History, Smithsonian Institution (NMNH), Virginia Museum of Natural History (VMNH), Virginia

Department of Conservation and Recreation, Division of Natural Heritage (NH), personal collection of the author, Paul Bedell (PB), and the Virginia Tech Department of Entomology insect collection (VT).

Date and locality information were obtained from specimen labels. If not provided on the labels, locality information was then determined to county. In this paper, counties are indicated in italics and independent cities in plain type. To avoid duplication in citing locality sources, I only cite literature sources when specimens were not in the collections I examined. In some instances, literature may refer to both museum specimens I examined and additional specimens from the same county not in the collections I visited. In these cases I have cited both sources.

Species are grouped in subfamilies based on the recent classification proposed by Dikow (2009). Subfamilies are in alphabetical order, as are genera within each subfamily, but without further subdivision into Tribes. Taxonomy and synonymies follow Fisher & Wilcox (1997).

RESULTS AND DISCUSSION

One hundred fifteen species of Asilidae are listed for Virginia based on personal collecting, literature records, and museum specimens. Eleven additional species are considered possible for a total of 126. Four species (*Ceraturgus mitchelli* Brimley, *Cyrtopogon laphriformis* Curran, *Holopogon oriens* Martin, and *Lasiopogon appalachensis* Cannings) are recorded for the first time from the state. Approximately 500 specimens of 82 species of Asilidae from Virginia were collected by or donated to the author.

Collection dates from all sources ranged from February into November (Fig. 2). The flight period of most Asilidae in Virginia occurs during the warm months of May through September, but *Nicocles pictus* (Loew) has an unusual and undescribed cold-season phenology.

The total of 126 species in Virginia compares closely to the 131 species (including 23 hypotheticals) reported for Arkansas (Barnes et al., 2007). Of this total, Virginia shares 83 species, or 63%. The confirmed totals are 115 in Virginia and 108 in Arkansas.

Within Virginia, the understanding of the geographic ranges of species of Asilidae is in its early stages. Some species are apparently widespread, such as *Efferia aestuans* (Linnaeus) (Fig. 3) and *Ommatius tibialis* Say (Fig. 4). Other species, such as *Eudioctria brevis* Banks (Fig. 5) and *Diogmites basalis* (Walker) (Fig. 6), are apparently restricted to the higher elevation western portion, whereas still others are apparently

Species	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.
<i>Nicocles pictus</i>										
<i>Lasiopogon marshalli</i>										
<i>Laphria flavicollis</i>										
<i>Eudioctria tibialis</i>										
<i>Ommatius tibialis</i>	-									
<i>Efferia aestuans</i>										
<i>Trichla interrupta</i>										
<i>Diogmites neoternatus</i>										
<i>Laphria affinis</i>										

Fig 2. Flight period phenology of selected Asilidae of Virginia.

restricted to the sandy coastal plain (e.g., *Stichopogon trifasciatus* (Say) [Fig. 7] and *Laphystia litoralis* Curran [Fig. 8]).

ANNOTATED CHECKLIST

Asilinae

Asilus sericeus Say

Albemarle (NMNH), *Alleghany* (PB, VMNH), *Caroline* (NH), *Fairfax* (NMNH), *Grayson* (PB), *Hanover* (PB), *Louisa* (VMNH), *Montgomery* (VT), *Nelson* (NMNH), *Powhatan* (PB), and *Prince Edward* (PB). 31 May-25 Sept.

This uncommon and distinctive large robber fly can be found in tall grass areas such as in unmowed fields or powerline rights-of-way. I have not observed them to perch on top of the grass, but rather down somewhat so that they are slightly hidden.

Efferia aestuans (Linnaeus)

Alleghany (VMNH), *Amelia* (PB), *Augusta* (NH), *Caroline* (NH), *Charles City* (PB), *Chesterfield* (NH, PB), *Fairfax* (NMNH), *Floyd* (NH, VT), *Giles* (VT), *Grayson* (VMNH), *Hanover* (PB, VT), *Mecklenburg* (VMNH), *Montgomery* (VT), *Nelson* (NMNH), *Patrick* (VT), *Roanoke* (Bullington, 1978), *Shenandoah* (NH), *Surry* (NMNH), *Wythe* (VT), and the cities of *Chesapeake* (NMNH), *Norfolk* (NMNH), *Richmond* (VT), *Salem* (NMNH), *Suffolk* (VT), and *Virginia Beach* (NMNH). 19 May-21 Oct.

One of the most common and widespread robber flies in Virginia. This species will perch vertically,

head-up, on grassy stubble. Females can be seen ovipositing in dry stubble as well.

Efferia albibarbis (Macquart)

Culpeper (NH), *Lunenburg* (NH), *Middlesex* (VT), *Northampton* (VMNH), *Richmond* (VT), *Spotsylvania* (VT), *Surry* (NMNH), *York* (VMNH), and the cities of *Norfolk* (NMNH), *Portsmouth* (NMNH), *Richmond* (NMNH), *Suffolk* (NH), and *Virginia Beach* (PB, NH). 27 May-29 Sept.

This fairly common species likes open areas, and is especially likely on sandy beaches. Often perches on the ground.

Efferia kondratieffi Bullington & Lavigne

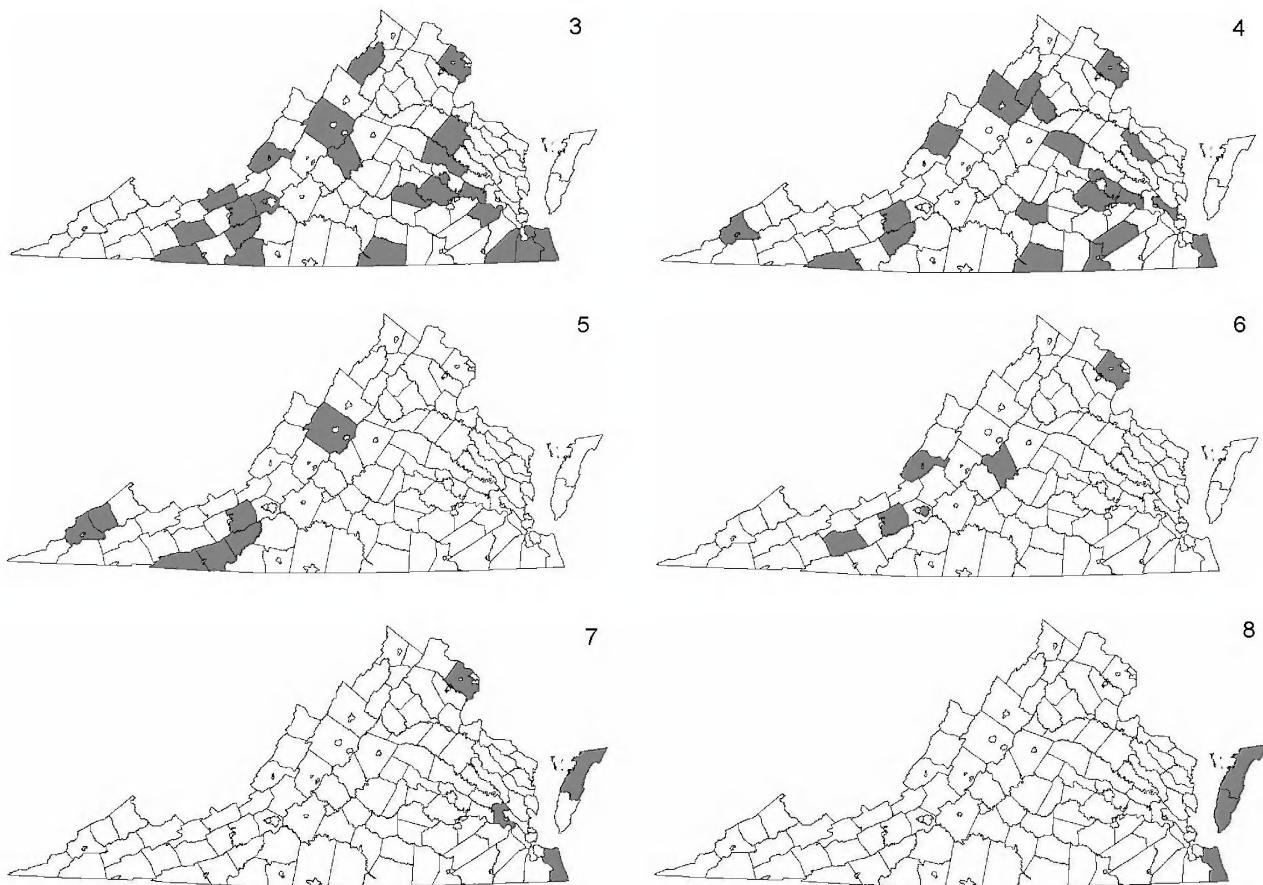
Carroll, *Craig*, *Floyd*, *Giles*, *Grayson*, *Lee*, *Louisa*, *Montgomery*, *Russell* (all Bullington & Lavigne, 1984b), and *Washington* (PB). 26 May-28 July.

A recently described species from western Virginia, closely related to *E. aestuans*.

Efferia plena (Hine)

Charles City (NH) and *Fairfax* (NMNH). 4 July-20 Aug.

Eastern United States records of *E. nemoralis* (Hine) have been redescribed as *E. plena* (Barnes, 2007); *E. nemoralis* is now considered to be restricted to the south-central states. The Charles City Co. record was collected at the Harrison Lake National Fish Hatchery where it was perched on the ground around the ponds. Museum records for this species throughout the East are very sparse (Barnes, 2007).



Figs. 3-8. Virginia city and county records of selected species of robber flies. 3. *Efferia aestuans*. 4. *Ommatius tibialis*. 5. *Eudiocetria brevis*. 6. *Diogmites basalis*. 7. *Stichopogon trifasciatus*. 8. *Laphystia litoralis*.

***Efferia pogonias* (Wiedemann)**

Alleghany (PB), *Dinwiddie* (VMNH), *Fairfax* (MCZ, NMNH), *King George* (NMNH), *Montgomery* (VT), *Prince Edward* (VT), *Westmoreland* (VT), and the cities of *Newport News* (NMNH), *Richmond* (VT, VMNH), *Suffolk* (NMNH), and *Winchester* (VT). 23 July-30 Oct.

A summer to autumn open field species, where it perches on the ground or low vegetation.

***Machimus antimachus* (Walker)**

Amherst (VMNH), *Chesterfield* (PB), *Greenville* (VMNH), and the cities of *Richmond* (VMNH), *Suffolk* (PB), and *Virginia Beach* (NMNH). 31 May-7 Oct.

***Machimus autumnalis* (Banks)**

Carroll (PB), *Chesterfield* (PB), *Culpeper* (NH), *Fairfax* (NMNH), and *Floyd* (PB). 30 May-28 Sept.

I found this species at Pocahontas State Park, where several perched low on oak sapling leaves in a

woodland opening in late September. The specimens from *Carroll County* taken on 30 May indicate that this is not strictly a fall species as the name implies.

***Machimus erythocnemius* (Hine)**

Bath (PB), *Fairfax* (McAtee & Banks, 1920), *Henrico* (VT), and *Powhatan* (PB). 20 July-22 Sept.

***Machimus johnsoni* (Hine)**

This species is little known. It was originally described by James Hine in 1909 from *Delaware County*, *Pennsylvania* (near *Philadelphia*) based on specimens taken by Charles Johnson in 1893. There is a record in *McAtee & Banks* (1920) from *Beltsville*, *Maryland*. Previously unreported from *Virginia*, I located two specimens at the *NMNH*. One was taken at *Great Falls* on 22 July (no year), the other is from "Dyke" with no date. "Dyke" could refer to the crossroads of that name in *Greene County* in the *Blue Ridge Mountains*, or (more likely) to *Dyke Marsh* in

Fairfax County on the Potomac River just south of Washington, D.C.

***Machimus lecythus* (Walker)**

Alleghany (PB), *Arlington* (MCZ), *Culpeper* (NH), *Cumberland* (NH), *Fairfax* (MCZ, NMNH), *Grayson* (PB), *Richmond* (PB), and *Tazewell* (NMNH). 30 May-22 Aug.

My specimens were collected in rank riparian vegetation or unmowed grasslands.

***Machimus maneei* (Hine)**

Fairfax (MCZ, NMNH), *Nelson* (NMNH), *Prince Edward* (PB), and *Prince William* (PB). 31 May-26 Sept.

***Machimus notatus* (Wiedemann)**

Alleghany (PB), *Augusta* (PB), *Bath* (NH), *Botetourt* (NH), *Chesterfield* (PB), *Dickenson* (PB), *Fairfax* (Mathis, 2008), *Grayson* (PB), *Greene* (NH), *Madison* (PB, NH), *Nelson* (NMNH), *Page* (NH), *Prince Edward* (PB), *Rockingham* (NH), *Suffolk* (PB), and *Wise* (PB). 17 May-21 Aug.

Common and widespread.

***Machimus novaescotiae* (Macquart)**

Chesterfield (PB, NH, VT), *Charles City* (PB), *Culpeper* (NH), *Fairfax* (NMNH), *Grayson* (NH), *Henry* (VMNH), *Loudoun* (NMNH), *Page* (NH), *Powhatan* (PB), *Rappahannock* (NH), *Surry* (NMNH), *Sussex* (PB), and *York* (NMNH). 15 June-19 Sept.

***Machimus paropus* (Walker)**

Fairfax (MCZ, NMNH). 16 July-25 Sept.

This species is more common in states to our north, and may reach its southern limit in northern Virginia.

***Machimus sadyates* (Walker)**

Amherst (PB, VMNH), *Bath* (NH, PB), *Bedford* (NH), *Botetourt* (PB), *Fairfax* (NMNH), *Giles* (VT), *Prince William* (PB), *Wise* (PB), and *Wythe* (VMNH). 14 July-20 Sept.

This seems to be a species of the western part of the state, especially at higher elevations. My specimens are from riparian vegetation.

***Machimus snowii* (Hine)**

Fairfax (MCZ, NMNH), and Dismal Swamp [Chesapeake or Suffolk] (NMNH). 6 July-25 Sept.

***Machimus virginicus* (Banks)**

Chesterfield (PB), *Fairfax* (McAtee & Banks,

1920), *Greene* (NH), *Prince William* (PB), *Rockbridge* (NH), and *Wise* (PB). 28 May-4 Aug.

***Mallophora orcina* (Wiedemann)**

Amelia (PB), *Chesterfield* (PB), *Fairfax* (NMNH), *Goochland* (NMNH), *Nelson* (NMNH), *New Kent* (VMNH), and *Richmond* (NMNH). 22 June-13 Oct.

This species is an excellent bee mimic and can also be mistaken for a *Laphria*, but it occurs after most *Laphria* are done for the season. My records are from woodland edge habitat.

***Megaphorus clausicellus* (Macquart)**

Fairfax (NMNH), *Highland* (PB), *Isle of Wight* (VMNH), *Nelson* (NMNH), *Norfolk* (Cole & Pritchard, 1964), *Nottoway* (VMNH), and *Richmond* (VT, VMNH). 30 June-20 Sept.

***Megaphorus laphroides* (Wiedemann)**

One museum record (NMNH) from Virginia Beach in "September." There is also an 11 August record from Virginia Beach (Cole & Pritchard, 1964).

This is a species of the southeastern states. Its range may be similar to many other taxa in that its northern range limit extends to southeastern Virginia.

***Neoitamus flavofemoratus* (Hine)**

Carroll (PB), *Chesterfield* (PB), *Dickenson* (NH), *Fairfax* (Mathis, 2008; PB), *Floyd* (VMNH), *Giles* (VT), *Grayson* (PB), *Madison* (PB), *Montgomery* (VT), *Page* (NH), *Prince William* (PB), *Rockbridge* (VT), and *Virginia Beach* (PB). 14 May-14 Sept.

A common and widespread woodland species that perches on the end of a twig or small branch. They seem to prefer a perch that is adjacent to an edge situation, e.g., a few feet inside the edge alongside a woodland road rather than conspicuously in the open.

***Neoitamus orphne* (Walker)**

Augusta (NH), *Bath* (NH), *Carroll* (PB), *Greene* (NH), *Highland* (PB), *Page* (NH), *Rockbridge* (NH), *Rockingham* (NH), *Russell* (VMNH), and *Washington* (PB). 30 May-2 July.

A fairly common species in the western portion of the state in similar habitats as its congener.

***Neomochtherus angustipennis* (Hine)**

Arlington (NMNH), *Fairfax* (Hine, 1909), and *King & Queen* (VT). 1 Aug.-13 Sept.

The lone specimen at the NMNH from "Barcroft, Va" includes a pupal case, and was collected from under a pine tree.

***Neomochtherus auricomus* (Hine)**

Fairfax (MCZ, NMNH), *Nottoway* (VMNH), and *Richmond* (VMNH). 13 Aug.-23 Oct.

Apparently a late summer and fall species.

***Philonicus fuscatus* (Hine)**

Albemarle (NH), *Alleghany* (PB), *Bath* (VMNH), *Bedford* (NH), *Botetourt* (PB), *Buckingham* (PB), *Fairfax* (Mathis, 2008), *Fluvanna* (NH), *Goochland* (NH), *Grayson* (NMNH), *Mecklenburg* (VMNH), *Powhatan* (NH), *Prince William* (VMNH), *Richmond* (PB), *Suffolk* (PB), and *Virginia Beach* (NH, NMNH). 16 May-18 Aug.

A widespread riverine species found perched on rocks in the streambed, on the ground along the streamside, or in riparian vegetation.

***Polacantha gracilis* (Wiedemann)**

Isle of Wight (PB), *Richmond* (NMNH), *Sussex* (PB), and *Virginia Beach* (PB). 15 June-11 Sept.

The few records of this southeastern species come from the eastern part of the state. At First Landing State Park, I obtained a pair from the bushy woodland edge behind the guest residence. The 80-year-old specimen at NMNH was taken near the University of Richmond campus, in habitat certainly no longer present.

***Proctacanthus brevipennis* (Wiedemann)**

Caroline (NH), *King & Queen* (VT), *Suffolk* (VT), and *Virginia Beach* (PB, NH, NMNH). 21 May-5 Aug.

Most occurrences are from the southeast corner of the state, where it can be found on open sandy soils and beach dunes. I observed it commonly at First Landing State Park along a powerline cut through the woods.

***Proctacanthus heros* (Wiedemann)**

King & Queen (VT). 24 Sept.

The largest of our asilids is included here based on a single specimen collected in 1938. More common in states to our south.

***Proctacanthus milbertii* Macquart**

Chesterfield (VT), *Richmond* (VT), and *Suffolk* (VT). 11 July-21 Aug.

***Proctacanthus nigriventris* Macquart**

Caroline (NH), *Chesterfield* (VT), *Suffolk* (VT), *Sussex* (PB), and *Virginia Beach* (PB, NMNH). 16 June-26 July.

This large, dark species prefers sandy areas, where it can be common. Females oviposit into sandy substrate. It has a buzzy flight and is probably restricted to the Coastal Plain.

***Proctacanthus philadelphicus* Macquart**

Fairfax (MCZ, NMNH), and *Virginia Beach* (VMNH). 18 Aug-30 Aug.

***Proctacanthus rufus* Williston**

Fairfax (NMNH), *Mecklenburg* (VMNH), *Nelson* (NMNH), *Richmond* (VT), *Richmond* (VT), and *Virginia Beach* (NH, PB). 22 June-5 Aug.

Judging from the number of museum specimens that also include a prey item, this species preys especially on Hymenoptera.

***Promachus bastardii* (Macquart)**

Alleghany (PB), *Fairfax* (NMNH), and *Nelson* (NMNH). 31 May-9 Sept.

My specimens were located in an unmowed, ungrazed field.

***Promachus rufipes* (Fabricius)**

Accomack (VMNH), *Botetourt* (VMNH), *Caroline* (NH), *Charles City* (PB), *Chesterfield* (PB), *Essex* (NH), *Goochland* (NH), *Henrico* (VT), *Henry* (VMNH), *James City* (VT), *Loudoun* (VT), *Louisa* (VMNH), *Montgomery* (VT), *Northampton* (VMNH), *Pittsylvania* (VT), *Portsmouth* (VT), *Prince Edward* (VT), *Prince George* (VMNH), *Prince William* (PB), *Suffolk* (Bullington, 1978; VT), *Warren* (VT), *Westmoreland* (VMNH), *Winchester* (VT), *Wise* (PB), and *York* (NH). 3 June-26 Oct.

This large and conspicuous species becomes fairly common in mid-summer, and can be observed especially during August.

***Triorla interrupta* (Macquart)**

Buckingham (PB), *Charles City* (PB, NH), *Chesterfield* (PB), *Cumberland* (NH), *Goochland* (PB), *Henrico* (VMNH), *Henry* (PB), *Isle of Wight* (PB), *Louisa* (PB), *Richmond* (VT), and *Virginia Beach* (NH). 8 June-30 Sept.

This rather large species appears to be fairly common statewide east of the mountains. It will attack prey on the ground, especially orthopterans.

Brachyrhopalinae

***Ceraturgus aurulentus* (Fabricius)**

Fairfax (NMNH). 18 Sept.

A very rare species. "Fewer than two dozen specimens have been collected in the past 200 years" (Barnes, 2008). The Virginia specimen was collected "near Plummer's Island", which is in the Potomac Gorge just west of Washington, D.C.

***Ceraturgus elizabethae* Brimley**

Arlington (NMNH), *Fairfax* (NMNH), and *Nelson* (NMNH). 20 June-18 July.

The last specimen collected in Virginia was taken in 1928. Nelson County is represented by four specimens at the NMNH spanning the years 1913-1928, but labeled without habitat or specific locality data.

***Ceraturgus fasciatus* Walker**

Arlington (Barnes, 2008), *Fairfax* (NMNH), *Floyd* (NH), *Hanover* (PB), *Highland* (NH, VMNH), *Montgomery* (VT), *Nelson* (NMNH), *Pittsylvania* (VT), *Richmond* (VMNH), and *Rockingham* (Barnes, 2008). 23 May-30 Aug.

This species, the most common and widespread member of the genus, was recently resurrected and split from the Midwestern *C. cruciatus* (Say) (Barnes, 2008). It is a mimic of *Vespula* wasps. My Hanover Co. specimen was found in an unmowed pasture of native forbs and grasses in a powerline right-of-way.

***Ceraturgus mitchelli* Brimley New state record!**

Alleghany (PB) and *Carroll* (PB). 28 May-30 May.

These records are the first for Virginia. One was taken in rank riparian vegetation, the other in tall grass in a meadow. This species may be more common than realized. Two days after I obtained the specimen in Alleghany County, I, along with Giff Beaton, Steve Krotzer, and Mike Thomas, took three more from a grassy meadow at Crooked Creek Wildlife Management Area in Carroll County.

***Cyrtopogon laphriformis* Curran New state record!**

Dickenson (PB). 2 June.

I collected a female specimen from low riparian vegetation along the Russell Fork River at Breaks Interstate Park on 2 June 2008 while it was perched on a leaf. Previously known only from New Hampshire and Pennsylvania (Fisher & Wilcox, 1997), this is the first record for Virginia.

***Cyrtopogon lutatius* (Walker)**

Fairfax (NMNH), *Montgomery* (VT), and *Prince William* (PB).

Three specimens were obtained in a Malaise trap run from 20 April to 27 May 2010 by A. V. Evans in the Bull Run Mountains. There is one specimen from Fairfax Co. collected on 24 May. The Montgomery Co. specimen was taken in a Malaise trap in a pasture, also on 24 May.

***Cyrtopogon marginalis* Loew**

Back (1909) mentions a female specimen from "Va." with no details. Melander (1923) includes

Virginia in its range, probably based on Back's record. I have not found any other museum or literature citations. Fisher & Wilcox (1997) list the range as "Ont. to N.H., s. to Mich. and Ga."

***Heteropogon macerinus* (Walker)**

Augusta (NMNH), *Fairfax* (MCZ, NMNH), *Franklin* (Dennis et al., 2008), *Montgomery* (VT), and *Stafford* (VMNH). 30 July-16 Oct.

This is an uncommon late summer to autumn species. Dennis et al. (2008) report pupal cases with pinned adults labeled "Rockymount, VA" from the Charles Triplehorn Insect Collection at Ohio State University.

***Holopogon guttulus* (Wiedemann)**

Fairfax (NMNH).

There is only one specimen at NMNH from "Mt. Vernon" captured on 4 July. Martin (1959) states that "Collecting records indicate that *guttula* (sic) is primarily a spring species."

***Holopogon oriens* Martin New state record!**

Carroll (M. Thomas, pers. comm.; PB) and *Washington* (PB). 1 June-2 July.

My Carroll Co. specimen, apparently the first state record, was collected in an unmowed old field. Mike Thomas also collected a specimen at Crooked Creek Wildlife Management Area on the same day. Only four museum specimens were located, all at the NMNH with none from Virginia.

***Holopogon phaeonotus* Loew**

Alleghany (PB), *Chesterfield* (PB), *Fairfax* (NMNH), *Hanover* (PB), *Madison* (PB), *Prince Edward* (PB), *Rockbridge* (PB), *Rockingham* (NMNH), and *Washington* (PB). 12 May-9 July.

I have found this species to be very common at Pocahontas State Park, and have recorded as many as 50 individuals during a field outing.

***Nicocles pictus* (Loew)**

Chesterfield (PB), *Fairfax* (NMNH), and *Nelson* (PB). 12 Feb.-12 May and 7 Oct.-7 Nov.

This cold tolerant species is the first asilid to emerge in the late winter and early spring. I have found them along roadsides in second growth woods. Males perch on unopened buds at the tip of a twig or small branch and slowly move their abdomen up and down. This movement makes the silvered and highly reflective tip of the abdomen (Fig. 1) appear to flash in the sunlight. Males can also be observed hovering in front of perched females. *Nicocles* is our only genus of asilid with spotted wings. I have observed this species on

the remarkably early date of 12 February, and have collected specimens as early as 3 March. I have also taken this species in the fall, making it possibly our only asilid with two broods, unless the fall adults overwinter.

***Nicocles politus* (Say)**

King & Queen (VT). 10 Oct.-13 Oct.

McAtee & Banks (1920) recorded dates for the Washington, D.C. area from 14 August to 2 October.

Dasypogoninae

***Diogmites basalis* (Walker)**

Alleghany (PB), *Fairfax* (NMNH), *Montgomery* (VT), *Nelson* (NMNH), *Roanoke* (VT), and *Wythe* (NMNH). 17 May-19 Sept.

This northeastern species is apparently found in Virginia primarily in the mountainous western counties. My specimen was taken in the same overgrown pasture where I found *D. discolor*.

***Diogmites discolor* Loew**

Alleghany (PB), *Arlington* (MCZ), *Augusta* (VT), *Fairfax* (MCZ, NMNH), *Floyd* (PB, VMNH), *Frederick* (VT), *Giles* (NH), *Loudoun* (VT), and *Nelson* (NMNH). 6 May-13 Sept.

***Diogmites misellus* Loew**

Chesterfield (NH), *Fairfax* (MCZ, NMNH), *Powhatan* (NH), and the cities of *Hopewell* (VT), *Newport News* (NMNH), *Norfolk* (NMNH), *Richmond* (NMNH, VT), and *Suffolk* (NMNH). 22 June-29 Sept.

***Diogmites neoternatus* (Bromley)**

Amelia (PB), *Arlington* (NMNH), *Bedford* (VT), *Buckingham* (NH), *Chesterfield* (NH, PB), *Chesapeake* (VMNH), *Cumberland* (NH), *Essex* (VMNH), *Greensville* (VMNH), *Louisa* (VMNH), *Mecklenburg* (VMNH), *Montgomery* (VMNH), *Richmond* (PB, VT), *Richmond* (VMNH), *Rockbridge* (VT), *Shenandoah* (NH), and *Virginia Beach* (PB, VMNH). 19 July-7 Oct.

The most common *Diogmites* in my experience, at least in the Piedmont. This species has entered my house on several occasions, but they are difficult to find in my yard if I deliberately seek them.

***Diogmites salutans* Bromley**

Isle of Wight (Bromley, 1936).

The only record for Virginia comes from Bromley's (1936) original description of the species. He indicates a lone female from "Smithfield, Va." with no date or additional locality information. A photograph, possibly

of this species, was taken by Tom Murray in the Dismal Swamp on 11 August 2007. It should be sought in southeastern Virginia.

***Taracticus octopunctatus* (Say)**

Arlington (MCZ, NMNH), *Chesterfield* (PB), *Fairfax* (MCZ, NMNH), *Suffolk* (MCZ), and "Lake Drummond" [Chesapeake or Suffolk] (NMNH). 11 May-31 July.

I have observed this small, attractive species in my yard. It would perch on a sunlit leaf within a foot of the ground in an area of wild grape and very small hardwood saplings. Possibly a generalist species that is more common than the few records indicate.

Dioctriinae

***Echthodopa formosa* (Loew)**

I am not aware of any museum specimens from Virginia, nor have I observed this species in the field. Its range is described as "Mass. to Miss. and Ga." (Fisher & Wilcox, 1997), but records within this range are few and scattered (Adisoemarto & Wood, 1975). Back (1909) lists Virginia without details, so I include it here rather than in the hypothetical list. Three specimens at the NMNH are from "Cheat Mountain, West Virginia." This location in Randolph County is not very far west of Highland County, Virginia.

***Eudioctria albius* (Walker)**

Augusta (NMNH, PB), *Bath* (NH), *Carroll* (NH, PB), *Giles* (VT), *Grayson* (PB), *Highland* (PB), *Nelson* (NMNH), "Skyland" [Shenandoah National Park on the Page/Madison county line] (NMNH), *Virginia Beach* (NH), and *Washington* (PB). 22 May-9 Sept.

***Eudioctria brevis* Banks**

Augusta (PB), *Carroll* (NH, PB), *Dickenson* (PB), *Floyd* (NH), *Grayson* (NH, PB), *Montgomery* (VT), *Prince William* (PB), and *Wise* (NH). 6 May-20 June.

***Eudioctria tibialis* (Banks)**

Arlington (NMNH), *Carroll* (PB), *Fairfax* (Mathis, 2008, NMNH), *Loudoun* (NMNH), *Prince Edward* (PB), and *Stafford* (NMNH). 22 May-9 July.

My male specimen is of the variety *tibialis* with the basal half of the tibiae yellow. The behavior of this species has been studied in Maryland (Scarborough, 1981). The study sites were in forest clearings where *E. tibialis* first emerged in early June, rapidly reached maximum abundance, and was largely gone by mid-July. Adults were estimated to have a lifespan of two to three weeks.

Laphriinae

Andrenosoma fulvicaudum (Say)

This genus was out on loan at the NMNH, so I was unable to record specimen data there and did not find any Virginia material of this species in the other collections that I examined, nor did I encounter it in the field. It has a wide continental range, but there are few Virginia records. McAtee & Banks (1920) list dates from Great Falls [Fairfax Co.] of 10-12 July and from Washington, D.C. on 22 August. A grayish species with the distal end of the abdomen golden-yellow, which makes this species distinctive in the field. In British Columbia, Cannings (2010) states "It is attracted to forest fires; the females lay eggs in burned trees where the larvae prey on buprestid beetle larvae."

Atomosia glabrata (Say)

Arlington (NMNH), *Fairfax* (MCZ, NMNH), and *Suffolk* (MCZ). 11 June-14 Sept.

Widely distributed in eastern North America, but apparently rare and local (Barnes, 2008).

Atomosia puella (Wiedemann)

Alleghany (PB), *Amelia* (PB), *Arlington* (NMNH), *Bath* (VT), *Charles City* (PB), *Chesapeake* (NMNH), *Chesterfield* (NH, PB), *Dismal Swamp* [*Chesapeake* or *Suffolk*] (NMNH), *Fairfax* (NMNH), *Floyd* (NH), *Giles* (VT), *Hanover* (PB), *Highland* (PB), *Hopewell* (NMNH), *Loudoun* (NMNH), *Madison* (PB), *Montgomery* (VT), *Page* (NMNH), *Prince Edward* (PB), *Richmond* (VT), and *Rockingham* (NMNH). 12 May-4 Aug.

This may be one of the most common asilids in the state. Adults seem to perch on any available sunny upright surface including tree trunks, fence posts, logs, rocks, chairs, etc. and have a distinctive head-down posture. Adaptable and ubiquitous, I have recorded them from near the summit of Whitetop Mountain (elev. >5000 ft.), on a tree trunk in my suburban Chesterfield Co. yard, on a motel wall, pasture fencing, and on lawn furniture to give a few examples. They are easily overlooked due to their tiny size, but after one develops a search image, they can be found in many locations.

Atomosia rufipes Macquart

Arlington (MCZ, NMNH), *Fairfax* (MCZ, NMNH), *Goochland* (PB), *Loudoun* (NMNH), *Nelson* (NMNH), and *Virginia Beach* (MCZ). 20 June-9 Sept.

My only record was one serendipitously captured when it was trapped inside a vehicle.

Atomosia sayii Johnson

Fairfax (MCZ, NMNH) and *Winchester* (VT). 29 June-26 Aug.

McAtee & Banks (1920) record this species as "Common, June 10 to September 5", but the few museum records and my own field experience do not support that observation.

Cerotainia albipilosa Curran

Fairfax (NMNH), *Floyd* (NH, PB), *Grayson* (NH, PB), "Thoroughfare Gap" [*Prince William*] (NMNH), and *Richmond* (PB). 3 June-27 July.

This species has been studied at a woodland site in Maryland where the seasonal distribution spanned early July until early September (Scarborough & Norden, 1977). Yearly occurrence varied from seven to ten days depending on spring temperatures or rainfall patterns.

Cerotainia macrocera Say

Amelia (PB), *Charles City* (NH), *Chesterfield* (NH, PB), *Fairfax* (NMNH), *Floyd* (NH), *Grayson* (NH, PB), *Hampton* (VT), and *Powhatan* (PB). 21 May-22 Sept.

A study of the asilid fauna at three sites in Maryland found *C. macrocera* to be the most common species in all locations (Scarborough, 1974). The author noted that "*C. macrocera* forages one to two meters from low sunlit shrubs and stems of erect dead herbs located along the margin of temporary streams." I have seen them perched on poison ivy (*Toxicodendron radicans*) alongside a forest road, and on the tips of pawpaw (*Asimina triloba*) leaves.

Lampria bicolor (Wiedemann)

Amelia (PB), *Charles City* (PB), *Fairfax* (NMNH), *Loudoun* (NMNH), and *Richmond* (NH, PB). 23 May-21 Aug.

I have found this uncommon species in riparian deciduous woods such as at James River Park in Richmond, and in woodland edge habitats. Perches on leaves.

Laphria affinis Macquart

Caroline (NH), *Charles City* (PB), *Fairfax* (NMNH), *Floyd* (NH), *Isle of Wight* (PB), *King & Queen* (VT), *King William* (VT), *Montgomery* (VT), *Suffolk* (VMNH), *Surry* (PB), *Sussex* (PB), and *Virginia Beach* (NMNH). 21 July-16 Nov.

Unlike the rest of the genus, this variably large species occurs in late summer and fall.

Laphria aktis McAtee

Carroll (PB), *Dickenson* (NH, PB), *Fairfax*

(McAtee, 1918; Bullington, 1986), *Floyd* (Bullington, 1986; NH), *Giles* (Bullington, 1986), *Loudoun* (Bullington, 1986; NH), and *Nelson* (Bullington, 1986). 7 May–27 July.

A beautiful golden fly, fairly common in early summer. Perches within a few feet of the ground on leaves that afford a good view of passing prey. Apparently more common than the very similar *L. sericea*.

Laphria canis Williston

Arlington (Bullington, 1986), *Chesterfield* (Bullington, 1986), *Dickenson* (PB), *Fairfax* (Bullington, 1986; Mathis, 2008; NMNH), *Giles* (Bullington, 1986), *Grayson* (Bullington, 1986), *Highland* (Bullington, 1986), *Montgomery* (Bullington, 1986), *Page* (Bullington, 1986), and *Norfolk* (Bullington, 1986). 29 May–14 Aug.

Laphria champlainii (Walton)

Warren (VT). 20 Aug.

A northeastern species. Fisher & Wilcox (1997) list the range as “Pa.; Ohio, N.Y., Mass., Conn., N.J.” However, Bullington (2008) claims to have “collected it many times in southwestern Virginia.”

Laphria cinerea (Back)

Chesterfield (NH, PB), *Dinwiddie* (NMNH), *Isle of Wight* (PB), and *Richmond* (VT). 15 April–29 May.

One of the first robber flies of spring, this small *Laphria* can be identified in the field by the ashy color of the thick tufts of hair on the legs and abdomen. Found perched on logs in pine woods.

Laphria divisor (Banks)

Albemarle (NH), *Fairfax* (NMNH), *Giles* (NMNH), *Montgomery* (VT), *Page* (NH), and *Rockbridge* (VT, NH). 4 June–25 Aug.

Laphria flavicollis Say

Alleghany (PB), *Amelia* (PB), *Augusta* (NMNH, PB), *Buckingham* (NH), *Carroll* (PB), *Charles City* (PB), *Chesapeake* (NMNH), *Chesterfield* (PB), *Dickenson* (NH, PB), *Fairfax* (Mathis, 2008; NMNH), *Floyd* (NH), *Fluvanna* (PB), *Giles* (NMNH), *Goochland* (NH), *Grayson* (PB), *Hanover* (PB), *Henrico* (VMNH), *Highland* (NH), *Montgomery* (VT), *Nelson* (NMNH), *Page* (NMNH), *Pittsylvania* (VMNH), *Powhatan* (PB), *Prince Edward* (PB), *Prince William* (PB), *Richmond* (NH), *Rockbridge* (NH), *Rockingham* (NH), and *Surry* (NMNH). 27 April–8 Aug.

Common and widespread in deciduous woods where it perches low on rank vegetation or tree leaves

in sunlit areas. Probably our most abundant *Laphria*. A specimen in my collection was captured with the scorpionfly *Panorpa nebulosa* Westwood as prey.

Laphria grossa (Fabricius)

Alleghany (VMNH), *Bath* (VT), *Giles* (NMNH), *Fairfax* (NMNH), *Nelson* (NMNH), *Prince Edward* (PB), *Richmond* (NMNH), and *Wise* (NMNH). 1 June–15 Aug.

As the name implies, this species is very robust, with a loud, buzzy flight.

Laphria index McAtee

Chesterfield (PB), *Dickenson* (PB), *Fairfax* (NMNH), *Giles* (Bullington, 1986), *Greene* (NH), *Madison* (PB), *Montgomery* (Bullington, 1986), *Page* (Bullington, 1986), *Powhatan* (PB), *Prince Edward* (PB), *Richmond* (NH), and *Washington* (PB). 6 May–23 July.

A beautiful, common species of deciduous woodland edge.

Laphria ithypygia McAtee

Dickenson (PB), *Fairfax* (Mathis, 2008), and *Virginia Beach* (PB). 1 June–10 July.

My records come from opposite ends of the state. The Virginia Beach specimens were captured in a Malaise trap and a UV light trap. The Dickenson Co. specimen is from Breaks Interstate Park in dry woods.

Laphria posticata Say

Augusta (NH), *Dickenson* (PB), and *Fairfax* (McAtee & Banks, 1920). 4 June–9 Aug.

Laphria sacrator Walker

Rockingham (NH). 7 June.

Listed for Virginia in Geller-Grimm (2009), but I have been unable to determine the source of this record.

Laphria saffrana Fabricius

Fairfax (McAtee, 1920), *Nelson* (NMNH), *Prince Edward* (PB), *Richmond* (VT), and *Sussex* (PB). 22 May–11 July.

A striking and distinctive species, it is possibly a mimic of the *Vespula squamosa* (Drury) queen. Probably more common in southern counties, especially in sandy pine woods. Has a loud buzzing flight, and will perch low to the ground on logs.

Laphria sericea Say

Alleghany (PB, VMNH), *Dickenson* (PB), *Fairfax* (NMNH), *Giles* (McAtee, 1918), *Madison* (NMNH), *Montgomery* (VT), *Page* (NMNH), and *Wise* (PB). 7 May–5 Sept.

***Laphria sicula* McAtee**

Bath (PB), *Chesterfield* (NH, PB), *Fairfax* (Mathis, 2008; NMNH), *Powhatan* (PB), *Pulaski* (VT), *Richmond* (PB), *Sussex* (PB), and *Wise* (PB). 24 June-21 Aug.

Very common and widespread. Perches low to the ground on deciduous leaves. This is the most frequently observed asilid in my suburban Chesterfield Co. yard.

***Laphria thoracica* Fabricius**

Dickenson (PB), *Fairfax* (Mathis, 2008), *Frederick* (VT), *Giles* (NMNH), *Grayson* (NH, PB), *Madison* (PB), *Montgomery* (VT), *Nelson* (NMNH), *Richmond* (VMNH), *Rockingham* (NH), *Tazewell* (VT), *Winchester* (VT), and *Wise* (NH). 6 May-27 Aug.

This medium to large species is widespread in deciduous woods. Rather variable in appearance.

***Laphria virginica* (Banks)**

Caroline (NH), *Chesterfield* (PB), *Dickenson* (PB), *Fairfax* (NMNH), *Henry* (VMNH), *James City* (PB), *Montgomery* (VT), *Nelson* (NMNH), *Page* (NMNH), *Powhatan* (PB), *Sussex* (PB), and *Virginia Beach* (NMNH). 26 April-4 Aug.

This fairly common species can be found in sunlit areas of deciduous woods, or in more open areas such as clearcuts. It will perch on a sunny leaf within a few feet of the ground, or on a log.

***Laphria winnemana* McAtee**

Carroll (NH), *Fairfax* (NMNH), *Giles* (Bullington, 1986), *Grayson* (PB), *Montgomery* (Bullington, 1986), *Nelson* (NMNH), *Page* (Bullington, 1986), and *Roanoke* (Bullington, 1986). 2 June-11 Sept.

This small woodland species is very similar to *L. canis* and *L. sicula*. Most records are from western Virginia.

***Laphystia litoralis* Curran**

Accomack (VMNH), *Northampton* (VMNH), and *Virginia Beach* (NH, NMNH). 20 June-28 Sept.

This species is apparently restricted in Virginia to coastal sand beaches and dunes, where it can be abundant.

***Pogonosoma dorsatum* (Say)**

Chesapeake (NMNH), *Chesterfield* (PB), *Fairfax* (McAtee & Banks, 1920), *Richmond* (VMNH), *Sussex* (PB), and *Virginia Beach* (NH). 22 May-5 Aug.

This glossy, black-bodied and dark-winged species is a black wasp-mimic, perhaps of *Anoplius* spider wasps. Found in pine woods, they will perch horizontally on downed pine logs or head down on tree

trunks. Usually scarce, but I observed up to six individuals at Pocahontas State Park in pine woods on 3 July.

Leptogastrinae***Apachekolos tenuipes* (Loew)**

Arlington (MCZ), *Bath* (PB, VMNH), *Chesterfield* (NH, PB), *Fairfax* (MCZ, NMNH), *Madison* (NH), and *Warren* (VT). 29 June-20 Sept.

My specimens were collected in dry woods. Collection dates for five NMNH specimens ranged from 22 August to 20 September, but a study in Maryland showed *A. tenuipes* to appear in late spring, with flight dates ranging from the first of June through early July (Scarborough, 1974).

***Beameromyia disfascia* Martin**

Fairfax (MCZ, NMNH). 16 June-26 June.

Two paratype specimens located at the MCZ of this very small species were collected at Falls Church.

***Beameromyia floridensis* (Johnson)**

Virginia Beach (Martin, 1957). 13 Aug.-26 Aug.

Possibly a coastal species.

***Beameromyia pictipes* (Loew).**

Alleghany (PB), *Amelia* (PB), *Suffolk* (PB), and *Virginia Beach* (NH, PB). 15 June-30 July.

McAtee & Banks (1920) give dates of 4 June to 26 September in Washington, D.C. I found it to be common in grass on beach sand dunes at First Landing State Park. I have also found this tiny species in unmowed old field habitat.

***Beameromyia vulgaris* Martin**

Alexandria (NMNH) and *Fairfax* (MCZ, NMNH). 9 June-11 Sept.

Three Maryland specimens at the NMNH were collected on "waste ground."

***Leptogaster atridorsalis* Back**

Arlington (NMNH), *Charles City* (PB), *Essex* (VMNH), *Fairfax* (Martin, 1957), *Greenville* (VMNH), and *Virginia Beach* (VT). 17 June-19 Aug.

***Leptogaster brevicornis* Loew**

Amelia (PB), *Arlington* (NMNH), *Chesterfield* (NH, PB), *Fairfax* (MCZ, NMNH), *Greenville* (VMNH), *Powhatan* (PB), *Suffolk* (MCZ), and *Virginia Beach* (NH, NMNH). 11 June-13 Aug.

This is the most frequently encountered *Leptogaster* in Virginia in my experience.

***Leptogaster flavipes* Loew**

Arlington (MCZ), *Chesterfield* (PB), *Fairfax* (MCZ, NMNH), *Greensville* (VMNH), *Loudoun* (MCZ), *Prince William* (NMNH), *Shenandoah* (NMNH), and *Wise* (PB). 25 May-14 Aug.

In Maryland, this species was most abundant in July, though it was present in smaller numbers in June and early August (Scarborough & Sipes, 1973); it occurred in more humid areas of forests and was absent from dry areas. I have obtained specimens from my shaded, wooded yard in suburban Chesterfield Co. This indicates to me that this species is more common than existing records would indicate. Its secretive nature and insubstantial appearance cause it to be easily overlooked. I have observed this species to be active as early as 0730 h in June.

The type specimen of *L. loewi* (Banks) at the Harvard Museum of Comparative Zoology (MCZ) is from Paeonia Springs, Loudoun Co., VA. This species is regarded as a synonym of *L. flavipes* (Martin, 1957).

***Leptogaster incisuralis* Loew**

Arlington (Martin, 1957), *Augusta* (NMNH), and *Fairfax* (MCZ, NMNH). 9 June-6 Sept.

***Leptogaster virgata* Coquillett**

Arlington (MCZ), *Fairfax* (MCZ, NMNH), *Loudoun* (MCZ), *Prince William* (PB), *Rockingham* (NMNH), and "Upton" (probably *Arlington*) (NMNH). 21 June-3 Sept.

***Psilonyx annulatus* (Say)**

Cumberland (VMNH), *Fairfax* (Martin, 1957; NMNH), *Greensville* (VMNH), *Montgomery* (VT), *Richmond* (NMNH), *Shenandoah* (MCZ), and *Wise* (VT). 10 May-17 Sept.

***Tipulogaster glabrata* (Wiedemann)**

Augusta (Martin, 1957), *Fairfax* (MCZ, NMNH), *Floyd* (NH), *Grayson* (PB), *Highland* (PB), *Louisa* (PB), *Sussex* (PB), and *Virginia Beach* (NH). 15 June-17 July.

Ommatiinae

***Ommatius floridensis* Bullington & Lavigne**

Amelia (PB), *Hanover* (Bullington & Lavigne, 1984a), *Mecklenburg* (VMNH), *Northampton* (NMNH), *Prince Edward* (PB), *Suffolk* (Bullington & Lavigne, 1984a), and *Virginia Beach* (Bullington & Lavigne, 1984a). 31 May-1 Aug.

Range in Virginia probably limited to the Piedmont and Coastal Plain.

***Ommatius gemma* Brimley**

Bath (NH), *Essex* (VMNH), *Fairfax* (NMNH), *Greensville* (VMNH), *Isle of Wight* (PB), *Mecklenburg* (VMNH), *Roanoke* (Bullington & Lavigne, 1984a), *Virginia Beach* (NH, PB), and *Wise* (PB). 1 July-11 Oct.

The smallest member of this genus, and occurring later in the season. I have found this species in fairly shaded forest interior.

***Ommatius ouachitensis* Bullington & Lavigne**

Fairfax (NMNH). The only Virginia specimen is from Great Falls on 23 June.

The population in Montgomery Co., Maryland, and this adjacent record from Virginia, may represent an isolated eastern population of this mostly Midwestern species (Bullington & Lavigne, 1984a).

***Ommatius tibialis* Say**

Bath (PB, VMNH), *Charles City* (VT), *Chesterfield* (PB), *Essex* (VMNH), *Fairfax* (NMNH), *Floyd* (NH), *Grayson* (PB), *Greensville* (VMNH), *Henrico* (Bullington & Lavigne, 1984a), *Louisa* (VMNH), *Madison* (Bullington & Lavigne, 1984a), *Mecklenburg* (VMNH), *Montgomery* (Bullington & Lavigne, 1984a), *Page* (Bullington & Lavigne, 1984a), *Prince Edward* (PB), *Rockingham* (VT), *Sussex* (PB), *Virginia Beach* (NMNH), *Wise* (VT), and *York* (Bullington & Lavigne, 1984a). (26 March); 30 May-1 Sept.

The specimen from Essex County is from the remarkably early date of 26 March. This species is usually not seen until after the first of June. Common and widespread. It perches horizontally on stems and twigs, but not on the end bud.

***Ommatius wilcoxi* Bullington & Lavigne**

Chesterfield and *York* (both Bullington & Lavigne, 1984a).

A paratype specimen in the Virginia Tech Department of Entomology collection was captured at Presquile National Wildlife Refuge (Chesterfield Co.) on 6 August 1971.

Stichopogoninae

Lasiopogon appalachensis* Cannings*New state record!**

Dickenson (PB). 1 June.

Specimens of this newly described species were found to be fairly common on the rocks in the streambed of the Russell Fork River at Breaks Interstate Park and represent a new record for the state. Previously known only from KY, WV, and TN

(Cannings, 2002). Identification was confirmed by R. Cannings (pers. comm.).

***Lasiopogon marshalli* Cannings**

Alleghany (PB), *Carroll* (PB), *Chesterfield* (PB), *Giles* (Cannings, 2002), and *Richmond* (PB). 1 April-27 May.

This species was described in 2002 from the banks of the New River in Giles County, but my collections reveal that it is more widespread. I have collected it on Potts Creek south of Covington where it perched on rocks in the streambed. I have also captured specimens along sandy banks of the James River in Richmond and along Third Branch in Pocahontas State Park.

***Lasiopogon opaculus* Loew**

Chesterfield (PB) and *Petersburg* (Cannings, 2002). 26 April-9 May.

I initially misidentified many of my *L. marshalli* specimens as *L. opaculus*, because the key in Cannings (2002) couplet 11 relies on katatergite color (dark brown/black vs. white or pale yellow) that is apparently more variable than previously understood (R. Cannings, pers. comm.). This species is most common around the Great Lakes, and again in states to our south. Its status in Virginia is poorly understood.

***Lasiopogon slossonae* Cole & Wilcox**

Glencarlyn [Arlington] (Cannings, 2002) and *Carroll* (M. Thomas, pers. comm.). 23 April-30 May.

A female specimen from the VMNH has no locality data. Mike Thomas caught a male along Crooked Creek in Carroll County at a spot where *L. marshalli* was common on a gravelly sandbar.

***Lasiopogon terricola* (Johnson)**

Fairfax (MCZ). 30 April-19 May.

McAtee & Banks (1920) describe *L. terricola* as “common ... in bare sandy areas, often along paths on roads; April 17 to July 16.” I have not seen this species, but the dry habitat is apparently quite different from the rest of the genus, which is riparian.

***Lasiopogon woodorum* Cannings**

Alleghany (PB) and *Great Falls [Fairfax]* (Cannings, 2002). 2 May-30 June.

***Stichopogon trifasciatus* (Say)**

Accomack (VMNH), *Fairfax* (McAtee & Banks, 1920), *James City* (PB), and *Virginia Beach* (NH, VT). 22 June-9 Sept.

This species is restricted to sandy shores of rivers and beaches of the Coastal Plain, where it can be

common. Its size and behavior remind one of a tiger beetle (*Cicindela*).

***Townsendia nigra* Back**

Virginia Beach (MCZ). 13 June.

Our smallest asilid (4-5 mm). Originally described in 1909 from coastal New Jersey, this species is poorly known, and quite possibly overlooked due to its tiny size. I located three specimens at MCZ, which were collected in 1938 at “Cape Henry” by A. M. Brues. Its range and habitat may be similar to other sand-loving coastal species such as *Laphystia litoralis* and *Stichopogon trifasciatus*.

Trigonomiminae

Holcocephala abdominalis and *H. fusca* are very closely related. They are listed here as possible separate species, but their status is actually undetermined (E. Fisher, pers. comm.).

***Holcocephala abdominalis* (Say)**

Fairfax (NMNH), *Giles* (VT), *Grayson* (VMNH), *Montgomery* (VT), *Smyth* (VT), and the cities of *Charlottesville* (NMNH), *Emporia* (NMNH), and *Hampton* (VT), as well as the Dismal Swamp [Chesapeake or Suffolk] (NMNH). 1 July-18 Oct.

***Holcocephala calva* (Loew)**

Alleghany (PB), *Arlington* (NMNH), *Bath* (PB), *Fairfax* (NMNH), and *Floyd* (NH). 14 July-11 Aug.

I have found this species in an old field where it occurred with *H. fusca*.

***Holcocephala fusca* Bromley**

Alleghany (PB), *Amelia* (PB), *Bath* (PB), *Chesterfield* (PB), *Fairfax* (NMNH), *Floyd* (NH), *Greene* (NH), *Madison* (NH), *Montgomery* (VT), *Page* (NH), *Rappahannock* (NH), *Rockingham* (NH), and *Sussex* (PB). 21 July-11 Oct.

Near Fairfax, Virginia, *H. fusca* occurred along forest edges adjacent to large open areas rather than small forest clearings, and was never observed in the shaded forest interior (Dennis, 1979). They generally foraged from twig tips of blackberry and rose, from 30 to 120 cm above the ground.

Possible Species

The following species may be discovered in Virginia with future collecting, but I am not currently aware of any confirmed records for the state.

Cyrtopogon allenii Back

Fisher & Wilcox (1997) indicate that the range of this species includes "Mass., s. to Ga." Brimley (1922) collected it (along with *C. falto*) at "Spruce", North Carolina in late May.

Cyrtopogon falto (Walker)

I have collected this species in early June in Pocahontas County, West Virginia. It likely occurs at higher elevations in western Virginia.

Cyrtopogon lyratus Osten Sacken

Another hypothetical *Cyrtopogon*, it has been recorded in Pennsylvania and North Carolina. The North Carolina record is from the Black Mountains, about 5000 ft. [1524 m] (Brimley, 1922). To be sought at higher elevations in Virginia.

Diogmites crudelis Bromley

The largest *Diogmites* is a southeastern species with records from North Carolina to Florida (Artigas, 1966). A photograph apparently of this species was taken by Allen Bryan in Sussex County. It should be sought in southeastern Virginia.

Diogmites platypterus Loew

There are no Virginia records to my knowledge, but Fisher & Wilcox (1997) list the range as including "Md. s. to Tex. and Ga." This fairly large, dark-bodied and smoky-winged species should be easy to identify in the field and hard to overlook (unless mistaken for a wasp). Judging by museum specimens, *D. platypterus* is a Midwestern species, but there are a few scattered eastern records.

Eudioctria propinqua (Bromley)

I found only three specimens at NMNH: two from the White Mountains NH, and one from Great Smoky Mountains National Park. There are no Virginia records in Wilcox & Martin (1941). The distribution described in Adisoemarto & Wood (1975) is similar to that of *E. albius*, but there are no Virginia records indicated on the map.

Lampria rubriventris (Macquart)

No museum specimens or literature records were found for Virginia, but Fisher & Wilcox (1997) list the range as "Pa. to Fla." The type specimen is from Pennsylvania, and there are fourteen specimens from North Carolina in the Insect Collection at North Carolina State University as listed in their online inventory database. This species seems to be fairly widespread in the East, so it should eventually be found in Virginia.

Lasiopogon currani Cole & Wilcox

Cannings (2002) describes the range as "southeastern Ontario south to Georgia in, and east of, the Appalachian Mountains." The absence of Virginia records is likely a reflection on our lack of knowledge of its habitat and phenology.

Neomochtherus latipennis (Hine)

Range includes "N.H. s. to N.C." (Fisher & Wilcox, 1997). I have not found any museum specimens or state literature records for this apparently little known species.

Proctacanthus hinei Bromley

The range is described by Fisher & Wilcox (1997) as "Ont. to Mass., s. to Tex. and N.C." However, I have not seen any museum specimens or literature references from Virginia, nor have I encountered it in the field.

Proctacanthus longus (Wiedemann)

Both Fisher & Wilcox (1997) and Geller-Grimm (2009) list Virginia within the range, but I have not found the reference for this occurrence. There is only one specimen at the NMNH and it is from Georgia. There are eight specimens from North Carolina in the Insect Collection at North Carolina State University as listed in their online inventory database.

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I sincerely thank F. Christian Thompson at the Smithsonian National Museum of Natural History, Eric Day at Virginia Tech, Phil Perkins at the Museum of Comparative Zoology, and Richard Hoffman at the Virginia Museum of Natural History for access to their collections. I also thank Arthur V. Evans and Steve Roble of the Virginia Department of Conservation and Recreation, Division of Natural Heritage for generously collecting and contributing many specimens to this effort, and especially for including me in their field outings. And I thank Robert Cannings for his help identifying *Lasiopogon* specimens, Eric Fisher for his helpful comments on *Holcocephala*, and Mike Thomas for his assistance with *Holopogon*. I also thank Anne Chazal for preparing the maps. The numerous corrections and suggestions of two anonymous reviewers and the editor greatly improved this manuscript.

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Ground Beetles from the Quantico Marine Corps Base: 2. Thirty-six Additional Species from Recent Collections (Coleoptera: Carabidae)

Richard L. Hoffman

Virginia Museum of Natural History
Martinsville, Virginia 24112

ABSTRACT

The use of black light (UV) traps for collection of nocturnal insects at several sites on Quantico Marine Corps Base, Virginia, resulted in the accumulation of numerous phototropic carabid beetles, 36 species of which were not documented during an earlier inventory based on pitfall-trapping techniques in the same area. Collectively, the present total of 114 species compares favorably with the 117 species found during the past 60 years at Plummers Island, Maryland, a thoroughly-collected nearby site. Four species (*Elaphropus saturatus*, *Bradycephalus tantillus*, *Agonum galvestonicum*, and *Lebia atriceps*) are newly documented as members of the Virginia fauna, the last-named far out of range and probably the result of an anthropogenic event. On the basis of known distributions, as many as 40 additional carabid species may be discovered at Quantico with future collecting. The problem of distinguishing *Diplocheila assimilis* from *D. impressicollis* is discussed, and the male genitalia of a specimen considered to be the latter taxon are illustrated.

Key words: Beetles, Carabidae, Virginia, Quantico, distribution, *Diplocheila*.

The carabid beetle fauna of Quantico Marine Corps Base (QMBC), in Stafford and Prince William counties, Virginia, was documented 15 years ago (Anderson et al., 1995), at which time 78 species were known from the area. Since that report was based entirely upon specimens captured in pitfall traps, species partial to arboreal or riparian biotopes were notably under-represented. This bias was reflected in the disparity of carabid totals between Quantico and nearby Plummers Island, Maryland, where such habitats had been intensely sampled for nearly a century (Erwin, 1981) with 112 species collected there during the past 60 years. Subsequent collections reported by Stork (1984) bring the new recent total for the island to 117 species.

The effectiveness of other collecting techniques in supplementing pitfalls was dramatically demonstrated in the summers of 1998 and 1999 when personnel of the Division of Natural Heritage, Virginia Department of Conservation and Recreation operated UV light traps at several streamside localities within QMBC. While such traps are especially useful in sampling the nocturnal adults of such insects as mayflies, stoneflies, and caddisflies, they also attract a wide spectrum of beetles and heteropterans (often species rarely found by traditional manual techniques). These several collections, on being

processed at the Virginia Museum of Natural History (VMNH), were found to contain no fewer than 36 species of Carabidae not included in the 1995 list, which is now extended to 114 species. There can be little doubt that additional collection efforts could yield an eventual total of 150 species for this relatively small area. Many of these "probables" are already recorded for the adjoining Prince William Forest Park.

The sequence of taxa in the following list is that of the comprehensive checklist by Bousquet & Larochelle (1993). Collectors' names are omitted in the following entries: collections made in 1998 were by Anne C. Chazal and J. C. Ludwig, those in 1999 by Chazal alone. The numbers shown in parentheses reflect only voucher specimens retained at VMNH: often the actual series taken in the light traps was far greater.

Clivinini

Clivina americana Dejean. Chopawamsic Creek, 0.2 km below US Hy. 1, 20 July 1999 (4). New Breckenridge Road boat landing, 19 July 1999 (4). Cedar Run at Camp Upshur, 7 June 1999 (4). R14 grassland, 7 June 1999 (1).

Clivina punctigera LeConte. Cedar Run at Camp

Upshur, 7 June 1999 (1). This species is fairly widespread in Virginia east of the Blue Ridge, but has not been documented for Plummers Island.

***Clivina dentipes* Dejean.** New Breckenridge Road boat landing, 19 July 1999 (1). Cedar Run at Camp Upshur, 7 June 1999 (1). Widespread and usually abundant statewide.

Bembidiini

***Bembidion cordatum* (LeConte).** 0.8 km west of Belfair Crossroads, Range 14 grassland site, 7 June 1999 (1). This very distinctive species is widespread in Virginia at low elevations, but infrequently collected: VMNH has only 12 specimens from five counties. It is not listed for Plummers Island.

***Bembidion affine* Say.** New Breckenridge Road boat landing, 19 July 1999 (2). Cedar Run at Camp Upshur, 7 June 1999 (3). David's Crossroads, 3 August 1998 (2).

***Bembidion patruelae* Dejean.** New Breckenridge Road boat landing, 19 July 1999 (2).

***Bembidion americanum* Dejean.** South Fork Quantico Creek at Rt. 618 bridge, 20 July 1999 (1). This species and the two preceding are generally distributed in Virginia.

***Bembidion rapidum* (LeConte).** Range 14 grassland site, 4 August 1998 (1). David's Crossroads, 3 August 1998 (1). This species is statewide in Virginia, but with only a few sporadic localities known for the Coastal Plain. It is curious that at QMBC, it was found in 1998 but not in the more extensive 1999 collections.

***Polyderis laevis* (Say).** New Breckenridge Road boat landing, 19 July 1999 (1). This smallest of Virginia's carabid species is widespread in eastern United States and probably statewide in Virginia at low to moderate elevations, although all VMNH specimens are from localities east of the Blue Ridge.

***Paratachys oblitus* (Casey).** Cedar Run at Camp Upshur, 7 June 1999 (1). Widespread in Virginia east of the Blue Ridge. Not recorded for Plummers Island.

***Paratachys proximus* (Say).** New Breckenridge Road boat landing, 19 July 1999 (4). Cedar Run at Camp Upshur, 7 June 1999 (1). Chopawamsic Creek, 0.2 km below US Hy. 1, 20 July 1999 (1).

***Paratachys scitulus* (LeConte).** Site by old US Hy. 1, bottomland hardwoods, 24 August 1998 (5). Widespread in Virginia west of the Fall Line; only one Coastal Plain site (Greenville County) in the VMNH material.

Elaphropus saturatus (Casey). New state record!

New Breckenridge Road boat landing, 19 July 1999 (1). Although documented for five adjoining states by Bousquet & Laroche (1993), this common species has apparently not been recorded previously for Virginia. It is known, however, from the Maryland side of the Potomac River at both Plummers Island (Erwin, 1981) and Bear Island (Evans, 2008).

Chlaeniini

***Chlaenius sericeus sericeus* (Forster).** Chopawamsic Creek, 0.2 km downstream from US Hy. 1, 20 July 1999 (1). Although widespread in Virginia, this species has most often been captured east of the Blue Ridge. It is not, however, an austral species because several of the western records are from sites above 3000 feet. Like other members of this genus, *C. sericeus* is not usually attracted to black light traps.

Chlaenius pennsylvanicus pennsylvanicus Say.

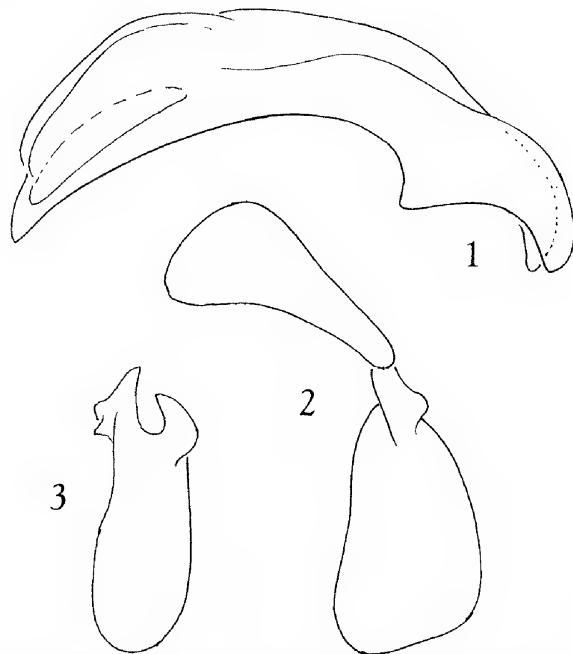
Chopawamsic Creek, 0.5 km downstream from US Hy. 1, 20 July 1999 (1). Cedar Run near Camp Upshur, 7 June 1999 (1). Although this species appears to occur over most of eastern United States, all but one of the VMNH records are for Coastal Plain (or Fall Line) localities.

Licinini

***Diplocheila impressicollis* (Dejean).** Cedar Creek at Camp Upshur, 7 June 1999 (1). This identification is made with some diffidence, because the published distinctions between *D. impressicollis* and *D. assimilis* LeConte (e.g., by Lindroth, 1968: 941, 943) rely upon characters that are subjective, variable, and trivial. The lateral profile of the aedeagus (Fig. 1) resembles the drawing provided by Lindroth (op. cit., fig. 480b) in being apically acuminate, while the shape of the prothorax more closely approximates that shown (op. cit., Fig. 479c) for *D. assimilis*.

The deciding factor has been the virtual obliteration of the 7th elytral stria, a feature stressed as diagnostic for *D. impressicollis*. As Lindroth's drawings of the male genitalia do not adequately show the form of the parameres, I take this occasion to illustrate their form at least as it is manifested in the Virginia material (Figs. 2, 3). I could see no trace of the fine apical crenulation of

Harpalini



Figs. 1-3. 1. *Diplocheila impressicollis*, aedeagus in right lateral aspect. 2. Parameres in ventral aspect to show outline of sclerites detached from aedeagus and flattened (right paramere above, left below). 3. Left paramere in a different orientation to show basal lobes. Drawings made to same scale.

the aedeagus indicated for both species in Lindroth's cited figures.

Distributional data given by Bousquet & Larochelle (1993) imply that both of these nominal species occur widely in eastern North America, with *D. assimilis* somewhat more northern in its range. Virginia is listed among the known states of record for *D. impressicollis*, on what basis is not specified. Owing both to the close similarity of the two, and previous confusion about application of the names, perhaps their actual distribution remains to be established by re-examination of all museum material standing under the two names.

VMNH possesses material apparently conspecific with the Quantico specimen from several localities in the Coastal Plain: *Greenville Co.*: DF site at end of Rt. 666, 1 mile E of Claresville, 9 May 1993 (1), 3 June 1993 (1). *Isle of Wight Co.*: Antioch Pines Natural Area Preserve, 5 km S of Zuni, 21 May 1996 (1). *Middlesex Co.*: Dragon Run at Rt. 603 bridge, 12 May 1979 (1). *City of Suffolk*: Williamson Ditch, Great Dismal Swamp National Wildlife Refuge, 16 May 1998 (1). *City of Virginia Beach*: False Cape State Park, Wash Woods, 18-21 May 1998 (1).

***Acupalpus indistinctus* Dejean.** Range L7 grassland, 5.5 km SW jct. Rts. 610 and 641, 20 July 1999 (1). Apparently eastern in Virginia, but few Coastal Plain records. Not recorded for Plummers Island.

***Acupalpus rectangulus* Chaudoir.** Cedar Run at Camp Upshur, 7 June 1999 (2). Site by old US Hy. 1, 24 August 1998 (2).

***Agonoderus lecontei* (Chaudoir).** Chopawamsic Creek at New Breckenridge Road, 7 July 1999 (1). Garrisonville, 8 September 1999 (1). Cedar Creek at Camp Upshur, 7 June 1999 (1). South Fork Quantico Creek, 21 September 1998 (2).

***Anisodactylus dulcicollis* (LaFerté-Sénectère).** Old field PF site 2, off MCB Rt. 1, 15 May 1991, J. C. Mitchell (2). These specimens were identified after publication of the first report. The range of this southern species is transcontinental, with an interior extension as far north as Nebraska, and another on the Atlantic Coast to Virginia. The Quantico site is apparently the northernmost locality known in this latter projection.

***Bradycellus tantillus* (Dejean).** New state record! Cedar Run at Camp Upshur, 7 June 1999 (1). Although recorded for several adjoining states, this minute harpaline has apparently not been documented previously for Virginia.

***Stenolophus ochropeplus* (Say).** New Breckenridge Road boat landing, 24 August 1999 (1). Garrisonville, 8 September 1999 (2). David's Crossroads, 3 August 1998 (1). Chopawamsic Creek, 22 June 1998 (1). Cedar Run south of Camp Upshur, 7 June 1999 (2). This small harpaline is probably the most abundant carabid in the Virginia fauna (documented from 50 counties). The species is usually represented in black light traps operated anywhere in the state except at elevations above 3000 feet, but exhibits a marked partiality for low, moist habitats. At Plummers Island, Stork (1984) found it only in the primary floodplain.

Platynini

***Agonum aeruginosum* Dejean.** South Fork Quantico Creek at Rt. 618, 20 July 1999 (3). Chopawamsic Creek, 20 July 1999 (1). Cedar Run at Camp Upshur, 7 June 1999 (2). This common species is essentially statewide in Virginia, ranging from sea level to about 4000 feet. It is

generally associated with wet habitats, from streamsides to small bogs and seeps, and the majority of the 96 VMNH specimens were collected in Coastal Plain counties where such conditions are prevalent. The only capture noted for Plummers Island is dated 1919.

***Agonum collare* (Say).** Site by old US Hy. 1, 24 August 1998 (1); 0.8 km W of Belfair Crossroads, 7 June 1999 (1).

***Agonum galvestonicum* (Casey). New state record!** Chopawamsic Creek, 0.2 km downstream of US Hy. 1, 20 July 1999 (1). This rarely-collected species was listed by Bousquet & Larochelle (1993) for only five states, all but South Carolina in the interior of the continent. Our specimen is slightly teneral, but agrees in every respect with Lindroth's (1966) description. Aside from several features in general habitus, the lack of basal prothoracic setae is particularly diagnostic.

Perigonini

***Perigona nigriceps* (Dejean).** Range L7 grassland, 5.5 km SW jct. Rts. 610 and 641, 20 July 1999 (1). The majority of our Virginia records for this small beetle are in the Coastal Plain, but it has been found occasionally in the Piedmont as far west as Pittsylvania County. All of the 23 VMNH specimens were taken at black light traps.

Odacanthini

***Leptotrachelus dorsalis* (Fabricius).** Cedar Run at Camp Upshur, 7 June 1999 (1). Essentially statewide in Virginia, but most records are from the Piedmont and Coastal Plain. The species is not recorded for Plummers Island.

Lebiini

***Calleida viridipennis* (Say).** Chopawamsic Creek at Breckenridge Road, 7 June 1999 (2). This species is frequently found beneath loose bark, and is occasionally attracted to UV light. It is widespread in Virginia, most often captured in the Piedmont and Coastal Plain.

***Plochionus timidus* Haldeman.** Chopawamsic Creek at Breckenridge Road, 7 June 1999 (1); also 24 August 1999 (1). Bottomland hardwood forest near old US Hy. 1, 24 August 1998 (1).

***Lebia atriceps* LeConte. New state record!** Cedar Run at Camp Upshur, 7 June 1999 (1). Since the known range of this species (Madge, 1967, Fig. 141) is

centered on the Rocky Mountains between central Alberta and western Texas (thus west of the 100th meridian), the capture of a specimen in Stafford County, Virginia is certainly remarkable. The identification was made independently by Arthur V. Evans and myself on the authority of Madge's (1967) revision of *Lebia*, and is beyond question.

That this locality is part of the species' natural range seems very implausible, and the possibility of anthropogenic transport (perhaps from a western military base) must be accounted. A somewhat analogous situation has been recorded (Hoffman, 2009) for the gnaphosid spider *Nodocion rufothoracicus* Worley, the range of which is likewise west of the 100th meridian except for a single capture in Cumberland County in the Virginia Piedmont, far from any developed areas.

***Lebia atriventris* Say.** Breckenridge Road, 22 June 1998 (1). This species occurs in much of eastern United States, but was previously known in Virginia only from a few localities in Fairfax County (Madge, 1967). VMNH has a considerable number of specimens, all except one of them from sites west of the Fall Line.

***Lebia grandis* Hentz.** Chopawamsic Creek at Breckenridge Road, 7 June 1999 (1). Statewide and frequently collected in Virginia, from sea level to nearly 3000 feet at Burkes Garden (Tazewell Co.).

***Lebia ornata* Say.** Chopawamsic Creek at boat landing, 22 June 1998 (1). Statewide in Virginia, from sea level to 5200 feet at Mount Rogers.

***Lebia viridis* Say.** New Breckenridge Road boat landing, 19 July 1999 (1). Statewide in Virginia, from sea level to 3500 feet, probably occurring in every county.

***Pinacodera limbata* (Dejean).** Pond R6, 22 June 1998 (1). New Breckenridge Road boat landing, 24 August 1999 (2). Bottomland hardwood forest near old US Hy. 1, 24 August 1998 (1). Like the preceding, this beetle occurs throughout the Commonwealth.

***Dromius piceus* Dejean.** Range L7 grassland, 5 km SW jct. Rts. 610 and 641, 20 July 1999 (1). Statewide and common in Virginia.

SUMMARY

Despite their geographic proximity (only about 50 km apart) and relatively adequate level of sampling for carabids, several factors discourage comparison between the faunas of Quantico Marine Corps Base and Plummers

Island, Maryland (whence 117 species of carabids have been documented in recent years). The surface areas involved are totally disparate, with Plummers Island scarcely larger than several of the individual sites inventoried at Quantico, which embraces a much wider range of habitat types. Furthermore, collecting techniques employed at the two areas have been completely dissimilar: neither pitfall nor black light trapping were used through the long period of sampling at Plummers Island, while both constituted the total collecting effort at Quantico, where none of the traditional "hand capture" techniques was used.

Nonetheless, a few observations may be of some interest. One outstanding generalization for Plummers Island reflects the ephemeral composition of the carabid fauna. Out of a total of 220 species documented since 1905 by Erwin (1981) and Stork (1984), about 43% (94), are known only from captures made prior to 1925. Such paucity surely reflects the serendipitous discovery of transient individuals, fluvial or aeolian waifs. That Stork was able to add six species to the number tabulated by Erwin in just a few days of collecting by hand that yielded 78 different carabids implies that the end of the current resident total has not yet been reached. In addition to the occasional instability imposed by flood stages of the Potomac River, natural influences such as vegetational succession certainly affect the carabid diversity through time.

With these reservations, it may be noted that of the 114 carabid species now recorded for QMBC, no fewer than 58 have not been found at Plummers Island! This number includes such widespread and abundant forms as *Poecilus lucublandus* (152 Quantico specimens), *Pterostichus coracinus* (183), *Cyclotrachelus spoliatus* (324), and *Harpalus pensylvanicus* (397).

The island fauna had no species of *Carabus*, against four species at Quantico. Six species of *Dicaelus* were trapped at Quantico in some quantity, only three in small numbers at Plummers Island.

Possibly the almost completely forested condition of Plummers Island has excluded a considerable number of carabids, like those just specified, which are partial to open, ruderal habitats which occur widely at QMBC. That collection sites at Quantico represent an 18 kilometer east-west transect across the base from Coastal Plain habitats to upland Fall Line sites is surely a factor in the differences noted in the carabid faunas.

Virtually all of the Quantico carabids are widespread in eastern North America. A few (e.g., *Carabus serratus*, *Pterostichus moestus*, and *Harpalus plenalis*) are basically boreal in distribution and other records for them are on or west of the Blue Ridge. Quantico species

reflecting a distinctly austral distribution pattern include *Loxandrus inferus*, *Anatrichis minuta*, and *Diplocheila impressicollis*.

ACKNOWLEDGEMENTS

The Virginia Museum of Natural History is under ongoing obligation to Dr. Steven M. Roble for transmission of the Quantico insect material resulting from survey activities of staff members of the Division of Natural Heritage, Virginia Department of Conservation and Recreation. Dr. Arthur V. Evans provided the authoritative identification for *Lebia atriceps*.

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Records of Butterflies and Skippers from Fort A. P. Hill and Vicinity, Caroline County, Virginia

Anne C. Chazal, Steven M. Roble, and Christopher S. Hobson

Virginia Department of Conservation and Recreation
Division of Natural Heritage
217 Governor Street
Richmond, Virginia 23219

ABSTRACT

Records of butterfly and skipper species, kept incidental to field surveys for rare, threatened, and endangered animals on Fort A. P. Hill (FAPH), Caroline County, Virginia, are presented. Fifty-eight species were identified within FAPH and its vicinity from 2005 to 2008. Of these, 31 new county records are documented. Additional observations made at FAPH during 1993-1994, and other Caroline County locations in 1999 and 2001, account for four additional species, two of which are new county records. Three of 32 species previously documented for Caroline County were not verified during our surveys. The total number of butterflies and skippers recorded for the county based on our surveys and previous reports is 65. This is comparable to other known surveys in the area.

Key words: Butterflies, distribution, Lepidoptera, skippers, Virginia.

INTRODUCTION

Opler et al. (2010) cited 163 species of butterflies and skippers (superfamilies Papilioidea and Hesperioidae, respectively) that have been documented in Virginia. Roble et al. (2001) documented one more species not listed by Opler et al. (2010). Despite the popularity of butterfly watching, documentation of common species is often lacking. For example, the Eastern Tailed-blue (*Cupido comyntas*), a common, easily recognized butterfly, is not documented by Opler et al. (2010) as occurring in Caroline County although it is well within its range and ample habitat is available. This paper documents butterflies and skippers observed in Caroline County by zoological staff of the Virginia Department of Conservation and Recreation, Division of Natural Heritage (DCR-DNH), while conducting zoological surveys for rare, threatened, and endangered species on Fort A. P. Hill (FAPH) between 2005 and 2008.

STUDY AREA AND METHODS

Caroline County encompasses 138,683 ha (342,695 acres) and is located approximately 59 km (37 miles) north of Richmond, VA and 93 km (58 miles) south of

Washington, D.C. The Fall Line, which separates the Coastal Plain from the Piedmont physiographic province, occurs in the western portion of the county. FAPH is located in the northeastern portion of Caroline County (Fig. 1). At 30,318 ha (75,794 acres), FAPH comprises approximately 22% of the area of Caroline County. A small portion (ca. 40 ha) of FAPH lies in Essex County. U.S. Route 301 bisects FAPH into north and south halves. U.S. Route 17 approximates the eastern boundary, and VA Route 2 approximates the western boundary. The elevation of FAPH ranges from 6 m (20 feet) above sea level where the base touches the broad valley of the Rappahannock River near Port Royal, to 76 m (250 feet) above sea level near the northwestern boundary.

All surveyed areas reported here are within the Coastal Plain. Most observation and collection records were made on FAPH. Three other locations were off the military base: Pettigrew Wildlife Management Area, the marshes at the mouth of Goldenvale Creek, and the uplands and stream complex on a parcel held by a private timber company. The first two locations are between the eastern boundary of FAPH and the Rappahannock River, and north of U.S. Route 301. The third location is south of White Lake near Jones Corner.

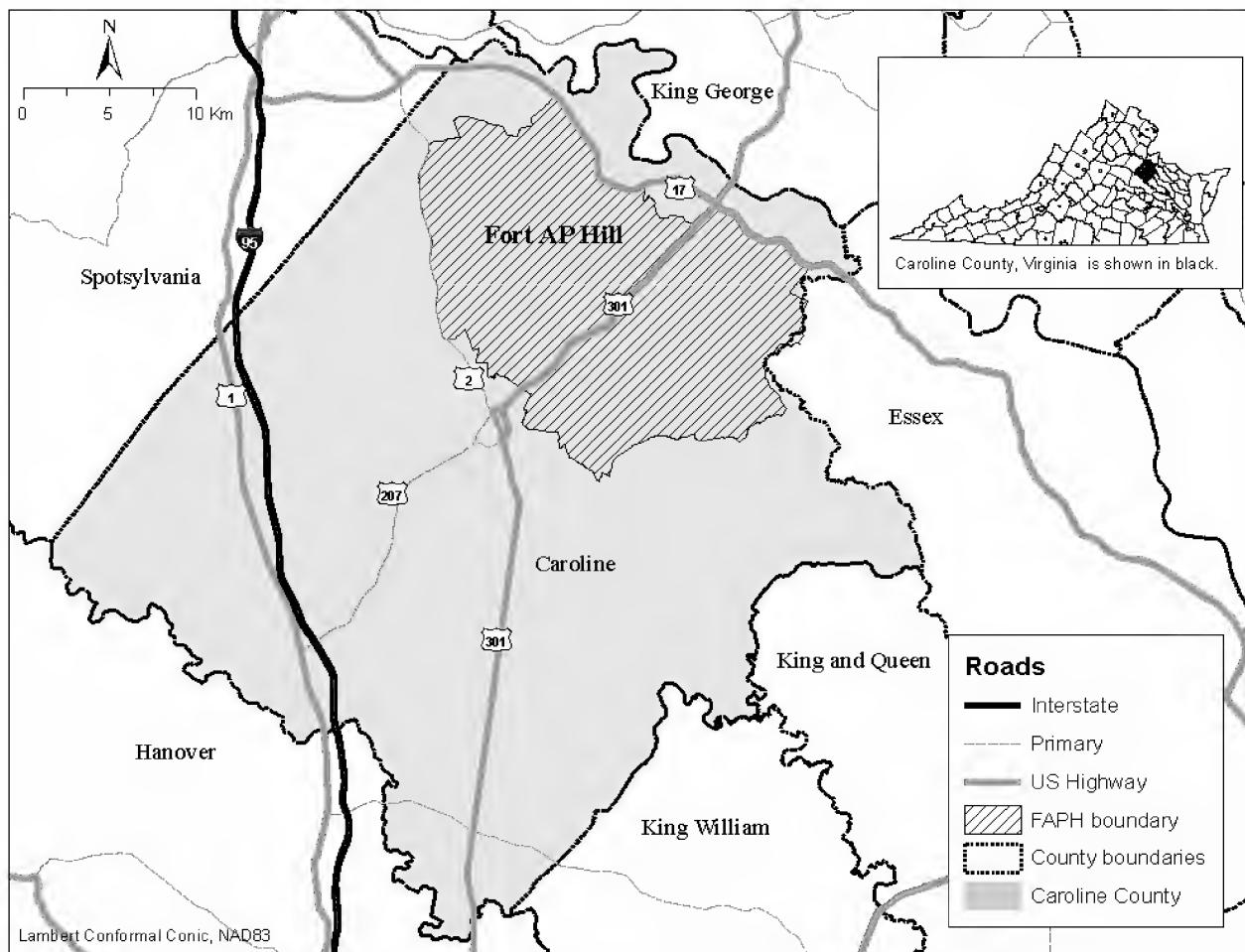


Fig. 1. Location of Fort A. P. Hill and Caroline County, Virginia.

In 2005, FAPH contracted with DCR-DNH to conduct surveys for rare, threatened, and endangered species. In the course of field work conducted from 2005 through 2008, lists of butterflies and skippers observed were kept incidental to other field observations. It was not the intent of these surveys to develop a comprehensive species list for lepidopteran species occurring on the base. Thus, the list reported here is not necessarily a complete species list for FAPH but reports observations recorded incidental to field surveys.

Surveys were conducted in a variety of habitats including fire-maintained pine savannah, old fields, roadsides, hardwood forested ravines, riverside, ponds, beaver meadows, powerline rights-of-way, upland pine/hardwood forests, freshwater marshes, and bottomland. The habitat types were not equally surveyed. For example, the fire-maintained pine savannah was contained within a controlled access area

where surveys were restricted to several days in early summer, and typically limited to morning-only surveys. Similarly, the freshwater marsh habitats on the Rappahannock River were only surveyed once.

Some voucher specimens were collected, but most records are based on visual identification. Collected specimens are deposited in the DCR-DNH collection. Records of observations were gathered from the field notes of each zoologist conducting surveys at FAPH. Observations made to the genus level, or with questions as to accurate identification were not included.

RESULTS AND DISCUSSION

Fifty-eight species of butterflies and skippers were documented by DCR-DNH between 2005 and 2008 at FAPH and the three off-base locations (Table 1). Of these, 31 species represent new county records based on comparisons to Opler et al. (2010).

DCR-DNH conducted similar surveys for rare, threatened, and endangered species at FAPH from 1993 to 1995. Notes were taken on the butterfly and skipper species observed during 1993 and 1994. Twenty-eight species were recorded during this time, all of which were also seen between 2005 and 2008.

DCR-DNH has conducted other field surveys in Caroline County over the years, including two days of surveys in the marshes of the Rappahannock River in the summer of 2001 and two surveys near the Pamunkey River in April 1999. Four species that were not seen during 2005-2008 (Fiery Skipper [*Hylephila phyleus*], Common Checkered Skipper [*Pyrgus communis*], Zebra Swallowtail [*Eurytides marcellus*] and Pipevine Swallowtail [*Battus philenor*]), were noted during these surveys. The first two species were previously documented from Caroline County (Opler et al., 2010), whereas both swallowtails represent new county records. Thus, the total known butterfly and skipper fauna of Caroline County is 65 species, including 33 new county records reported herein. Of the 32 species cited by Opler et al. (2010), only three were not observed by DCR-DNH: Wild Indigo Duskywing (*Erynnis baptisiae*), Hobomok Skipper (*Poanes hobomok*), and Hayhurst's Scallopwing (*Staphylus hayhurstii*).

By way of comparison, DCR-DNH documented 61 species of butterflies and skippers on Marine Corps Base – Quantico in the northeastern Piedmont of Virginia, from habitats similar to those at FAPH, during a 1998-1999 survey (Chazal, 2000). Taber (2003) reported 66 species from the southern tip of the Delmarva Peninsula during surveys between 1995 and 2003. Fifty-one species of butterflies and skippers were documented by DCR-DNH at Fort Pickett – Maneuver Training Center in the southern Piedmont of Virginia incidental to surveys for rare, threatened, and endangered species in 1993, 1999, and 2000 (Chazal et al., 2004). It is likely that more species will be added to the Caroline County list of butterflies and skippers with additional, targeted efforts.

The diversity, complex life cycles, and numbers of Lepidoptera make them an important component of ecological systems as pollinators, prey, and primary consumers. Butterflies and skippers are relatively well-studied groups of insects because of their accessibility and aesthetic appeal; however, they are often overlooked as an important part of natural resource management. The first step to including them in the conservation

process is to identify the species present and the habitats with which they are associated. The records presented here should help to fill information gaps in our understanding of the distribution of butterflies and skippers in Virginia.

ACKNOWLEDGMENTS

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Table 1. Butterfly and skipper species documented by DCR-DNH in Caroline County, Virginia. Species appear in taxonomic order according to Pelham (2008). 'Documented records' are taken from Opler et al. (2010). DCR-DNH records are classified as 'C' and 'O' for collected specimens and observations, respectively. Records include those taken during surveys on FAPH in 1993-1994, on private property in 1999, along the Rappahannock River in 2001, and during surveys on FAPH and its vicinity from 2005-2008. The last column compares the DCR-DNH records to those previously documented (Opler et al., 2010), where CR = county record, NV = not verified, and V = verified.

Scientific Name Common Name	Opler et al., 2010	DCR-DNH records 1993-1994	DCR-DNH records 1999 + 2001	DCR-DNH records 2005-2008	Comparison to Opler et al.
FAMILY HESPERIIDAE					
<i>Epargyreus clarus</i> Silver-spotted Skipper	X	O		C, O	V
<i>Achalarus lyciades</i> Hoary Edge				C, O	CR
<i>Thorybes bathylus</i> Southern Cloudywing				C, O	CR
<i>Thorybes pylades</i> Northern Cloudywing				C, O	CR
<i>Thorybes confusis</i> Confused Cloudywing	X			C	V
<i>Staphylus hayhurstii</i> Hayhurst's Scallopwing	X				NV
<i>Pholisora catullus</i> Common Sootywing			C-2001	C, O	CR
<i>Erynnis icelus</i> Dreamy Duskywing				C	CR
<i>Erynnis brizo</i> Sleepy Duskywing				C, O	CR
<i>Erynnis juvenalis</i> Juvenal's Duskywing		O		C, O	CR
<i>Erynnis horatius</i> Horace's Duskywing				C, O	CR
<i>Erynnis baptisiae</i> Wild indigo duskywing	X				NV
<i>Pyrgus communis</i> Common Checkered Skipper	X		C-2001		V
<i>Ancyloxypha numitor</i> Least Skipper	X	O		C, O	V
<i>Amblyscirtes vialis</i> Common Roadside Skipper				C, O	CR
<i>Lerema accius</i> Clouded Skipper	X			O	V
<i>Hylephila phyleus</i> Fiery Skipper	X		O-2001		V
<i>Polites origenes</i> Crossline Skipper				C, O	CR
<i>Wallengrenia egeremet</i> Northern Broken Dash				C	CR
<i>Pompeius verna</i> Little Glassywing				C, O	CR
<i>Atalopedes campestris</i> Sachem	X			C, O	V
<i>Poanes hobomok</i> Hobomok Skipper	X				NV

Table 1 (continued).

Scientific Name Common Name	Opler et al., 2010	DCR-DNH records 1993-1994	DCR-DNH records 1999 + 2001	DCR-DNH records 2005-2008	Comparison to Opler et al.
FAMILY HESPERIIDAE					
<i>Poanes zabulon</i> Zabulon Skipper	X			C, O	V
<i>Euphyes dion</i> Dion Skipper				C, O	CR
FAMILY PAPILIONIDAE					
<i>Battus philenor</i> Pipevine Swallowtail			O-2001		CR
<i>Eurytides marcellus</i> Zebra Swallowtail			O-2001		CR
<i>Papilio polyxenes</i> Black Swallowtail		O		O	CR
<i>Papilio glaucus</i> Eastern Tiger Swallowtail	X	O		O	V
<i>Papilio troilus</i> Spicebush Swallowtail	X	O	C-1999	O	V
FAMILY PIERIDAE					
<i>Abaeis nicippe</i> Sleepy Orange	X			O	V
<i>Pyrisitia lisa</i> Little Yellow				O	CR
<i>Colias philodice</i> Clouded Sulphur	X	O		O	V
<i>Colias eurytheme</i> Orange Sulphur	X	O		C, O	V
<i>Phoebeis sennae</i> Cloudless Sulphur	X			C, O	V
<i>Anthocharis midea</i> Falcate Orangetip		O		C, O	CR
<i>Pieris rapae</i> Cabbage White	X	O		O	V
FAMILY LYCAENIDAE					
<i>Lycaena phlaeas</i> American Copper				O	CR
<i>Callophrys gryneus</i> Juniper Hairstreak		O		C, O	CR
<i>Callophrys henrici</i> Henry's Elfin		O	C-1999	C, O	CR
<i>Callophrys niphon</i> Eastern Pine Elfin		O		C, O	CR
<i>Calycopis cecrops</i> Red-banded Hairstreak	X	O		C, O	V
<i>Strymon melinus</i> Gray Hairstreak	X			C, O	V
<i>Cupido comyntas</i> Eastern Tailed Blue				C, O	CR
<i>Celastrina ladon</i> Spring Azure		O		C, O	CR
<i>Celastrina neglecta</i> Summer Azure				C, O	CR

Table 1 (continued).

Scientific Name Common Name	Opler et al., 2010	DCR-DNH records 1993-1994	DCR-DNH records 1999 + 2001	DCR-DNH records 2005-2008	Comparison to Opler et al.
FAMILY NYMPHALIDAE					
<i>Libytheana carinenta</i> American Snout	X	O		O	V
<i>Danaus plexippus</i> Monarch	X	O		O	V
<i>Limenitis arthemis astyanax</i> Red-spotted Purple	X	O		O	V
<i>Limenitis archippus</i> Viceroy		O		O	CR
<i>Euptoieta claudia</i> Variegated Fritillary	X			O	V
<i>Speyeria cybele</i> Great Spangled Fritillary	X	C, O		O	V
<i>Asterocampa celtis</i> Hackberry Butterfly				C, O	CR
<i>Vanessa virginensis</i> American Lady	X	O		O	V
<i>Vanessa cardui</i> Painted Lady		O		O	CR
<i>Vanessa atalanta</i> Red Admiral	X			O	V
<i>Nymphalis antiopa</i> Mourning Cloak				O	CR
<i>Polygonia interrogationis</i> Question Mark	X	O		O	V
<i>Polygonia comma</i> Eastern Comma	X		C-1999	O	V
<i>Junonia coenia</i> Common Buckeye	X	O		O	V
<i>Chlosyne nycteis</i> Silvery Checkerspot				O	CR
<i>Phyciodes tharos</i> Pearl Crescent	X	O		C, O	V
<i>Satyrodes appalachia</i> Appalachian Brown		O		C, O	CR
<i>Hermeuptychia sosybius</i> Carolina Satyr	X			C, O	V
<i>Megisto cymela</i> Little Wood Satyr		O		O	CR
<i>Cercyonis pegala</i> Common Wood Nymph		O		O	CR
TOTALS	32	28	8	58	CR = 33 NV = 3 V = 29 Sum = 65

Purse-web Spiders, Genus *Sphodros*, in Virginia (Mygalomorphae: Atypidae)

Richard L. Hoffman

Virginia Museum of Natural History
Martinsville, Virginia 24112

ABSTRACT

The four native species of the purse-web spider genus *Sphodros* known to occur in Virginia are discussed in the context of their spatial and seasonal distribution in the state. Illustrations of taxonomic characters and distribution maps are provided for each species. Attention is directed to the disjunct occurrence of *S. niger* on the Eastern Shore of Virginia.

Key words: Purse-web spiders, Atypidae, *Sphodros*, Virginia, distribution, phenology.

INTRODUCTION

Among the nearly 900 species of spiders thought to occur in Virginia (Hoffman, unpub. data), four are so unusual in their structure and lifestyles as to lay a special claim on our interest and attention. These are the so-called “purse-web” spiders: species of the genus *Sphodros* and family Atypidae.

Within the broader context of spider classification, atypids belong in a supposedly primitive group called Mygalomorphae, commonly referred to as “tarantulas” – robust, often large and hairy, animals which personify the worst of spiderhood to arachnophobic humans. Although identified in the popular mind as inhabitants of deserts or tropical forests, mygalomorphs occur also in temperate forests of North America and Eurasia. Nine species are known to reside in Virginia, some of them actually widespread and abundant spiders although rarely seen, nor collected except by specialized techniques.

The four species of atypids make up almost half of our endemic mygalomorph fauna. Three decades ago, only two of them were known here, and even those only from single localities. In 1980, the genus *Sphodros* was documented in a careful study by Gertsch & Platnick which added a third, previously undescribed species, and set the stage for more detailed local studies. Initiation of numerous statewide inventory surveys of the soil and litter fauna of Virginia by staff of the Division of Natural Heritage, Virginia Department of Conservation and Recreation (DCR-DNH) and the

Virginia Museum of Natural History (VMNH) since the founding of those two agencies in the late 1980s resulted in an order of magnitude increase in knowledge of this cryptic fauna, justifying use of the term “well-known” for many groups previously only “poorly-known”. Our local atypids fall into this category, and were the subject of a preliminary report published in the first issue of *Banisteria* (Hoffman, 1992). Material acquired subsequently is sufficient to justify a more detailed summary of these spiders, along with the graphic information needed to achieve confident identifications. While we now have a fairly adequate concept of the Virginia species, there is still plenty to do as regards details of life history and fine-tuning the instate ranges.

Atypids are only rarely found by cursory hand-search of forest floor litter, and have gained a reputation for rarity. The use of pitfall trapping techniques has reversed this impression, as the quantitative data provided in the following species accounts will show. An interesting generality is that only males are captured in this way, often in surprising numbers. Females must spend their entire lives in the seclusion of burrows at the end of their curious tubular webs, the form of which resembles the elongated silken purses carried by women of former generations. A good description and photograph of the web of *S. abboti* was given by Comstock (1912), and the biology of *S. rufipes* (under the name *bicolor*) by Muma (1945). Although the latter author found a number of females (33 webs) in the vicinity of College Park, Maryland, he located no males

despite prolonged search and the use of unspecified "traps". In these two species, the female may extend the tubular web a foot or more up the trunk of a tree. The web is not sticky and the spider depends on her speed and alertness to get to the place where an insect has been slowed or delayed in crossing. The elongated cheliceral fangs execute an upward or outward stab through the web fabric into the victim, which is then dragged inside to be consumed at leisure. Observations on the biology of both *S. abboti* and *S. rufipes* in northern Florida have been published by Shear & Coyle (1981).

Species of *Sphodros* embody the appearance common throughout their family and suborder: a relatively robust body with short, strong legs. The rear half of the cephalothorax is strikingly flattened, the anterior half abruptly sloped upward with a median cluster of eight tiny eyes on the front margin. From the other local genera (*Ummidia*, *Antrodiaetus*, *Myrmekiaphila*) they are immediately distinguished by the large porrect chelicerae that approximate the length of the cephalothorax itself in males (Fig. 1).

The sternal region in both sexes is provided with four or five pairs of round to oval glabrous impressions (*sigilla*), which are characteristic for each species and offer the easiest way to distinguish females (Figs. 6-9). The sternal element between the coxae of the pedipalps ("labium") is coalesced with the major sternal sclerite, although traces of a suture line are evident in occasional specimens. The anterior end of this "labiosternum" is notably prolonged and strongly convex in *S. atlanticus*, displacing the reduced anteriormost pair of sigilla into an inconspicuous site near the coxal condyles.

Although most species tend to be dark in life (really black in *S. niger*), most tend to fade after some time in alcohol and assume an overall orange color with dark gray or purplish abdomen. This may be a function of preservation medium or exposure to sunlight. Some samples of *S. coylei* contain mostly testaceous specimens, in others all are very dark reddish-brown. The legs of *S. atlanticus* may also become orange, causing such specimens to resemble *S. rufipes*.

Reproductive organs of the male, localized in the terminal article of the first pair of legs (referred to as "pedipalps" in the spider literature), are of relatively simple structure that effectively distinguish the species (Figs. 2-5). The long, flagelliform *embolus* is carried distally by a sclerotized laminate blade, the *conductor*, the shape of which displays the most obvious differences and apparently reflects relationships. *Sphodros atlanticus* and *S. rufipes*, for example, share a very similar palpal configuration, while *S. niger* and *S. coylei* differ in conductor shape as well as overall form

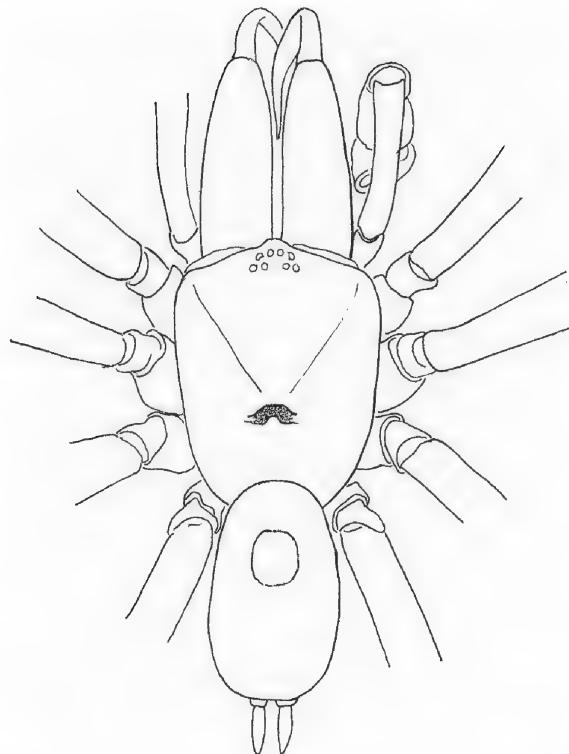
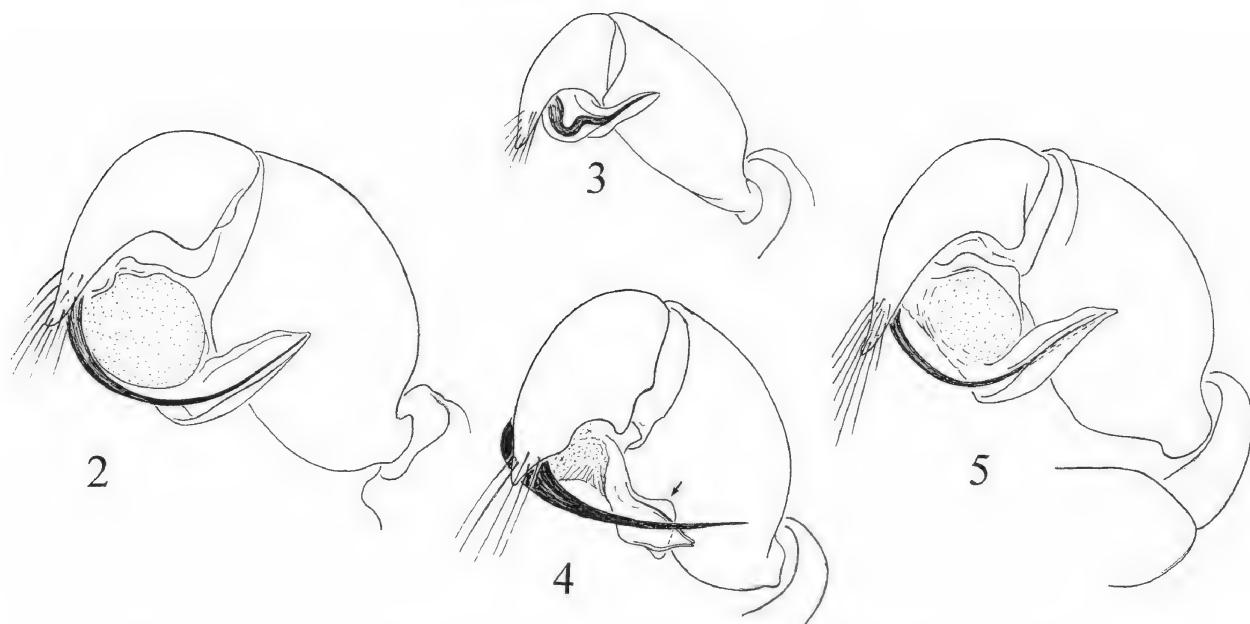


Fig. 1. *Sphodros coylei* Gertsch & Platnick. Dorsal aspect of male, only basal podomeres are shown. The distal segment of the chelicerae (fang) is here seen in a foreshortened perspective, actually it is as long as the basal segment against which it is normally reflexed.

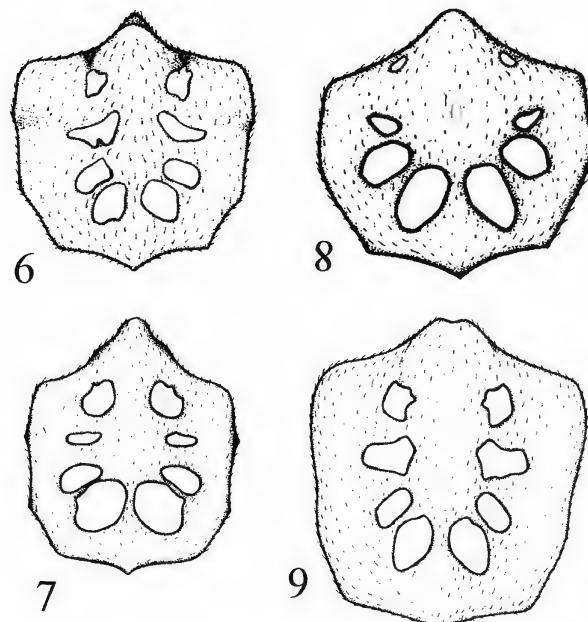
Key to male specimens of *Sphodros* in Virginia

1. Tibial article of pedipalp not notably incrassate (Fig. 3); base of embolus sigmoidally curved as seen in prolateral aspect; body length (including chelicerae) less than 10 mm, typically 7-8 mm *coylei*
- Tibia of pedipalp strongly incrassate, as broad as long (Figs. 2, 4, 5); base of embolus straight; body length typically greater than 10 mm 2
2. Conductor broadened distally, with subterminal laminate lobe, membranous basal region much reduced (Fig. 4) *niger*
- Conductor evenly and gradually acuminate distally, unmodified; basal region prominent (Figs. 2, 5) 3
3. Anterior third of sternum not convexly enlarged, anteriormost sigilla removed from edge of sternum; legs of living specimens bright orange-red *rufipes*
- Anterior third of sternum prolonged and strongly convex, anteriormost sigilla reduced in size and obscurely placed at its base near coxal condyle; legs of living specimens black (often fading to clear yellow after preservation) *atlanticus*



Figs. 2-5. Pedipalps of four species of *Sphodros*, prolateral aspect, to same scale. 2. *S. atlanticus*. 3. *S. coylei*. Note the sigmoid curvature of the embolar base and relatively slender palpal tibia. 4. *S. niger*. Subterminal lamina of the conductor indicated by the arrow. 5. *S. rufipes*. General similarity of form with that of *S. atlanticus* is evident.

of the palpomeres. Basally, the conductor merges into a region of white membrane of variable extent (stippled lightly in the drawings), possibly serving in some functional capacity during sperm transfer.



Figs. 6-9. Sternae of females of four species of *Sphodros* (from Gertsch & Platnick, 1980; sizes adjusted for uniformity). 6. *S. atlanticus*. 7. *S. coylei*. 8. *S. niger*. 9. *S. rufipes*.

In the following species accounts, if no collector or source is attributed, it is implied that the material resulted from inventory work conducted by VMNH staff. Cited numbers are those of males only unless otherwise specified. All specimens are in the VMNH collection unless another museum acronym is cited. All length measurements cited include chelicerae but not spinnerets.

The majority of the dates cited represent the last day of pitfall sampling periods usually two weeks in duration (occasionally a month or longer). They are therefore misleading, in that a specimen dated July 1 was almost certainly trapped during the last two weeks of June, and should be registered as active during that month rather than July.

Sphodros atlanticus Gertsch & Platnick

Figs. 2, 6, Map 1

Although the most common member of the genus in Virginia, this species was not recognized until described by Gertsch & Platnick in 1980, at which time *S. atlanticus* was known only from single localities in Virginia, South Carolina, Georgia, and Illinois, and two in North Carolina. Its capture at sites in 15 Virginia counties and cities testifies to the effectiveness of pitfall trapping and surely presages discovery of the species over an extensive Lower Austral range upon application of that technique.

In Virginia, the species seems most abundant in the Coastal Plain, although sporadic populations occur on the Piedmont nearly to the Blue Ridge (Map 1). Records for Prince William, King George, and Northampton counties suggest that *S. atlanticus* probably occurs in Maryland, possibly even as far north as southern New Jersey. A total of 49 male specimens (all but one in VMNH) was examined from the following localities:

Cumberland Co.: 7 km SSW of Columbia, hardwoods, 1 July 1990, J. C. Mitchell (1). *Fluvanna Co.*: 1 km SW of Kent's Store, 14 June 1995 (1). *Greensville Co.*: 1 mile E of Claressville, end of Rt. 666, 10-21 June 1993 (1); 25 March-25 May 1994 (3); 25 May-30 June 1994 (4); 3 miles SW of Skippers, 30 May 1990, J. C. Mitchell (2). *Henrico Co.*: National Guard Armory, ca. 2 miles SE of Sandston, 16 May-19 June 2001, K. L. Derge (1). *Isle of Wight Co.*: pine barrens 4 miles S of Zuni, 24 May 1985 (1), 4 June 1985 (2), both C. A. Pague. *King George Co.*: Naval Weapons Laboratory, Dahlgren, 26 June 1991, K. A. Buhlmann (1). *Mecklenburg Co.*: Elm Hill Wildlife Management Area, 11-29 May 1995 (1); ca. 4 miles SE of Boydton, Rt. 692, 16 June 1990, J. C. Mitchell (1). *Northampton Co.*: Savage Neck Dunes Natural Area Preserve, Eastville, 9 May-19 June 2004, D. Field (1). *Pittsylvania Co.*: ca. 4 miles ENE of Axton, 13 May-15 June 1992 (1). *Prince William Co.*: Prince William Forest Park, 14 June 1988 (3), 28 June 1988 (1), both D. A. Young. *Spotsylvania Co.*: Fredericksburg, 30 May 1917 (AMNH 1, collector not specified). *Stafford Co.*: Quantico Marine Corps Base, pitfall site 6, 22 May 1991, J. C. Mitchell (1). *York Co.*: Grafton Ponds, 27 May 1991 (5), 14 June 1991 (1), 25 June 1991 (2), all K. A. Buhlmann; Naval Weapons Station, Cheatham Annex, 2 June 1989 (2), 19 June 1989 (1), 14 May 1990 (1), 30 May 1990 (1), all K. A. Buhlmann. *City of Chesapeake*: Fentress Naval Air Station, 6 June 1989, K. A. Buhlmann (1). *City of Virginia Beach*: Little Creek Amphibious Base, 22 June 1989, K. A. Buhlmann (3); Munden Point, 3 May 1990 (1), 3 June 1990 (3), both N. L. Bland; Pungo, 18 June 1990, N. L. Bland (1).

***Sphodros coylei* Gertsch & Platnick**

Figs. 1, 3, 7, Map 2

Although known for 20 years only from the two type specimens taken at Clemson, South Carolina, this small atypid may be considered one of the two most widespread and abundant members of the genus in Virginia (Map 2); it is often taken in large numbers in

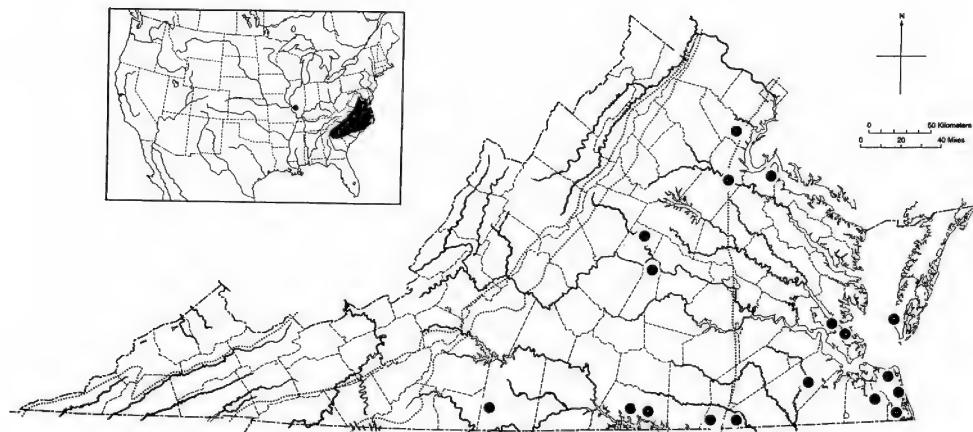
pitfall traps.

The northernmost known locality, in Prince William County, is less than 30 miles (50 km) from the District of Columbia and anticipates discovery of the species both there and in adjacent Maryland. It seems likely that *S. coylei* also occurs on the Eastern Shore of Virginia. One curious aspect of the species' distribution in Virginia is the presence of apparently disjunct populations in Pittsylvania and Franklin counties. As shown on Map 2 by "x" symbols, the species has not been found at five sites where extensive, year-round pitfall trapping was conducted, and at which other species of *Sphodros* were collected. The map is based on material (all VMNH) in the following samples:

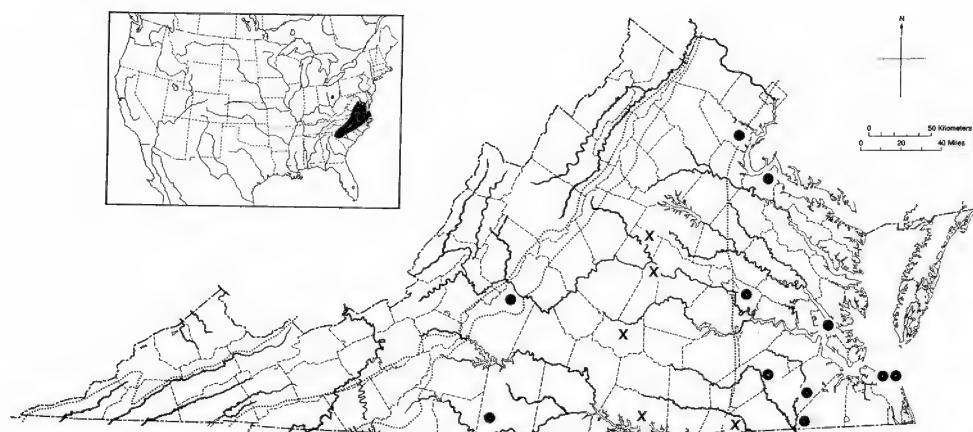
Franklin Co.: Smith Mountain 4-H Center, ca. 9 miles ENE of Rocky Mount, 13 March-17 April 1995 (4). *Henrico Co.*: Elko Natural Area, 1 mile W of Elko, 15 June 1990, C. A. Pague (3). *Isle of Wight Co.*: Blackwater Ecological Preserve, ca. 4 miles S of Zuni, 24 May 1985 (1), 17 April 1986 (1), both C. A. Pague. *King George Co.*: Naval Weapons Laboratory, Dahlgren, 26 June 1991, K. A. Buhlmann (1). *Pittsylvania Co.*: pitfall site ca. 3 miles ENE of Axton, 29 March-23 April 1992 (4). *Prince William Co.*: Prince William Forest Park, 19 April 1988, C. A. Pague (2), 8 May 1991, J. C. Mitchell (2). *Sussex Co.*: Chub Sandhill Natural Area Preserve, 6 miles SSE of Sussex, 30 April 2002, P. Koury (1). *York Co.*: Grafton Ponds, 4 April 1990 (24), 16 April 1990 (11), 1 May 1990 (5♂/1♀), 17 August 1990 (1), all K. A. Buhlmann; Yorktown Naval Weapons Depot, Cheatham Annex, 16 April 1990 (3), Jones Millpond site, 16 April 1990 (25), both K. A. Buhlmann. *City of Suffolk*: South Quay, ca. 6 miles S of Franklin, 4 April-6 June 2003, S. M. Roble (3). *City of Virginia Beach*: First Landing (Seashore) State Park, 1 April 1990 (9), 4 April 1990 (20), 14 April 1990 (17), 26 April 1990 (6), 1 May 1990 (10), 22 May 1990 (1), 7 June 1990 (1), all K. A. Buhlmann; Munden Point, 25 March 1990, N. L. Bland (12).

Despite this wealth of 167 male individuals from numerous collection sites, only a single female was captured (in a pitfall trap). She is substantially larger (12 mm total length) than accompanying males, and of interest in that the sigilla pattern resembles that of *S. niger* more than that of obviously conspecific males.

Aside from the relatively small mid-Atlantic range known for this species, it has also been reported from Ohio (Sierwald et al., 2005). Dr. Richard Bradley has informed me (pers. comm.) that this record is based on a male in the Ohio State University Chelicerates Collection from Youngs Branch, Lawrence County,



Map 1. Distribution of *Sphodros atlanticus* in Virginia. The Prince William County site is the northernmost known so far for this species.



Map 2. Distribution of *Sphodros coylei* in Virginia. The X symbols represent sites at which pitfall trapping was conducted for at least one year without capturing this species.

Ohio, taken on 7 May 1998. This is a remarkable disjunction across the entire Appalachian range, analogous to the Illinois record for *S. atlanticus* (Gertsch & Platnick, 1980), which is otherwise sympatric with *S. coylei*. Perhaps intensified pitfall collecting in Kentucky and Tennessee will provide additional substantiating records for both of these species in central United States.

As already noted in my earlier paper (Hoffman, 1992), males of *S. coylei* are definitely surface-active in spring and early summer; VMNH has only a single specimen taken later than 15 June. Seasonal partitioning in this genus is summarized in a concluding section.

One of the characters cited as diagnostic for *S. coylei* was the presence of "false sutures" in both the tarsi and metatarsi. In the Virginia material, I could not

confirm this condition for the metatarsal podomeres despite examination of legs in alcohol, air dried, or cleared in ethylene glycol, all of which showed about 10-12 annulations in the tarsi.

Sphodros niger (Hentz)

Figs. 4, 8, Map 3

Originally described from Northampton, Massachusetts, *S. niger* is the northernmost member of the genus, and occupies an extensive range: Massachusetts to Wisconsin and Kansas, south through the Appalachians to North Carolina (Gertsch & Platnick, 1980). This pattern is reflected in Virginia, where all but one (see discussion following) of our capture records are for the inner Piedmont and

mountains. The palpal conductor in this species departs somewhat from the generic norm by the development of a distinct subterminal lamina (Fig. 4, arrow). The illustrations given by Gertsch & Platnick (1980; Figs. 53, 54) show this development in a perspective that emphasizes the lamina at the expense of the true apex. I have examined what I believe is the specimen they illustrated (AMNH, Bergen Co., New Jersey) and find that, perhaps as the result of preservation, the palpal bulb is rotated out of the usual position and in prolateral view the lamina is seen "head-on" in its broadest dimension in both figures. The drawing provided here is from a Virginia specimen in which the normal orientation (confirmed by inspection of specimens from across the species' range) is represented.

Gertsch & Platnick (1980) cited only one locality for *S. niger* in Virginia. Even though we now have records from 12 counties, the species seems less abundant than either *S. atlanticus* or *S. coylei*, and most samples, even from prolonged pitfall trapping runs, contain only one or two specimens. The males of this species may be more normally surface active than any of its local relatives: several of the specimens cited below were found moving about during the day and collected by hand. This has not been true for any of the other three species of *Sphodros* in Virginia.

The map is based on material (all but one specimen in VMNH) in the following samples:

Alleghany-Bath Cos.: west side of Little Mountain along FS 342, ca. 1 mile W of Carrollover, 31 July 1994, NZP-CRC small mammal survey (1 imm.). *Augusta Co.*: Maple Flats area near Sherando, 26 May 1987, on road in daylight, R. L. Hoffman and K. A. Buhlmann (1); GWNF, 5 miles W of Stokesville, 16 June 1989 (4), 17 June 1989 (4), 9 July 1989 (1), all B. Flamm. *Botetourt Co.*: FS 812 on Apple Orchard Mountain, 3 miles W of Blue Ridge Parkway, 20 May 2000, J. Turner (1). *Cumberland Co.*: pitfall sites 2-7 km S of Columbia, 1 May 1990 (2), 17 May 1990 (4), 1 June 1990 (9), all J. C. Mitchell. *Fluvanna Co.*: pitfall site at Kent's Store, 14 May 1995 (7). *Northampton Co.*: Savage Neck Dunes Natural Area Preserve, Eastville, 9 May-19 June 2004, D. Field (1). *Pittsylvania Co.*: ca. 3 miles ENE of Axtion, 15 June-14 July 1992 (1). *Prince Edward Co.*: Hampden-Sydney College campus, 29 November 1989, W. A. Shear (1 imm.); Farmville, 28 June 1993, Justin Shear (1), 4 June 2001, W. A. Shear (1). *Prince William Co.*: Manassas National Battlefield Park, 24 May-21 June 1999, A. C. Chazal (1). *Roanoke Co.*: Fort Lewis Mountain, NW of Salem, 10 June 1993, M. W. Donahue (1). *Rockbridge Co.*: Big Mary's Creek, 3 miles SE of Vesuvius, on road in daylight, 24 June 1956, R. L. Hoffman (AMNH 1).

Warren Co.: NZP-CRC site, ca. 3 miles SE of Front Royal, 2-28 May 1996 (1). *Wise Co.*: Powell Mountain Karst Preserve, 4.5 miles SE of Big Stone Gap, 27 May-10 June 2009 (2), 29 June-2 July 2009 (1), all C. S. Hobson.

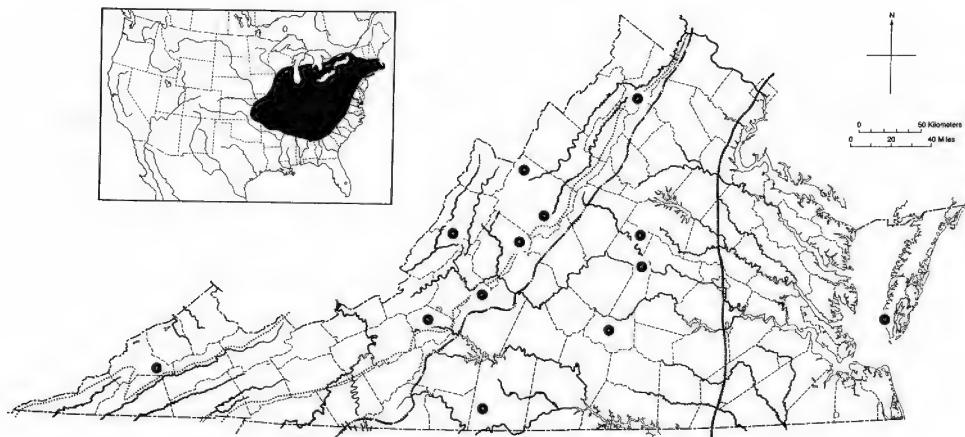
Known Virginia localities (Map 3) reflect the basically subboreal distribution of the species: the great majority of collection sites lie west of a line drawn between Great Falls and Danville, Virginia. The single male captured at Savage Neck Dunes is thus a remarkable departure from this pattern, for which I have no explanation other than a small relict population surviving after a post-glacial westward retraction of the species (even the four Piedmont sites may fall under this premise). There can be no doubt of the provenance because I personally sorted the pitfall sample from which it was extracted. That sample contained two specimens of *Sphodros*, the other one being a male *S. atlanticus*. If I had chosen that one to examine, I would surely have assumed that both were the same species, and the occurrence of *S. niger* on the Eastern Shore would have gone unnoticed indefinitely.

Sphodros rufipes (Latreille)

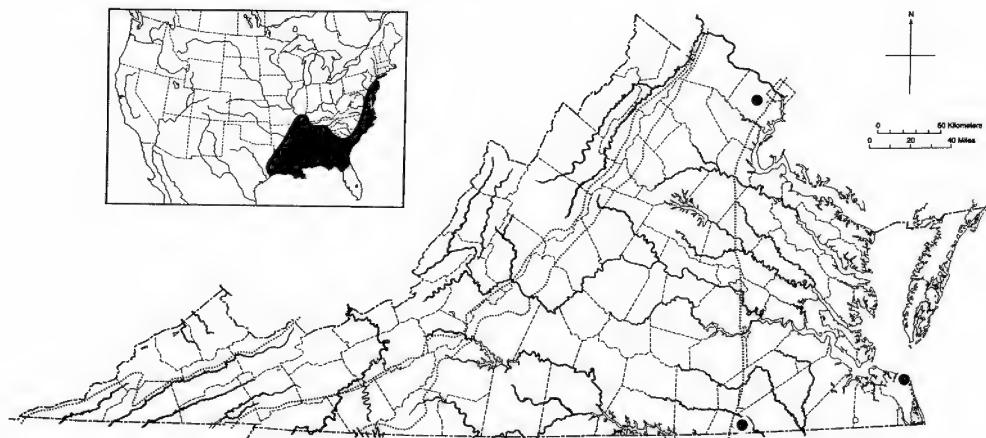
Figs. 5, 9, Map 4

For many years this striking species was known as either *Atypus bicolor* or *A. milberti* (both names occur on museum specimen labels) - the older name *rufipes* was not restored until Gertsch & Platnick (1980) confirmed its priority. It is the largest member of the genus (females up to 25 mm in length) and perhaps the most widely distributed: Rhode Island to Texas, mostly in the Coastal Plain but extending northward in the Mississippi embayment to Illinois. The species also invades the southern end of the Appalachians at low elevations. This range is allopatric with the structurally similar Midwestern taxon *S. fitchi*.

Sphodros rufipes is certainly not abundant in Virginia. For many years the only record was for Falls Church, where Nathan Banks located a population in 1909, and collected a small series over the next several years. That the species still exists in the metropolitan area is suggested by a telephone call that I received in 2008 from a resident in Alexandria who described a large black spider with red legs in her home (specimen was not captured or destroyed). The VMNH sample from Greensville County was taken by sheer good luck, in a pitfall that had operated for a year and only at the last minute was given another month extension beyond its intended lifespan. During that final month two males rewarded that impulsive reprieve. The male from First Landing State Park was the sole representative of its



Map 3. Distribution of *Sphodros niger* in Virginia. The disjunct record for Northampton County is the only site in the Coastal Plain south of Long Island at which this species is known. Does it portend eventual discovery elsewhere on the Delmarva Peninsula, perhaps even in New Jersey?



Map 4. Distribution of *Sphodros rufipes* in Virginia.

species taken in extensive pitfall collecting at six adjacent localities for a year. During April and May of that period, more than 60 specimens of *S. coylei* were trapped at the First Landing site.

Many of the VMNH specimens of *S. atlanticus* are discolored by preservation, their legs fading to a clear yellow, and at first were thought to be *S. rufipes* because the palpal organ is similar in both species. Fortunately, the strongly convex sternum and obsolete anteriormost sigilla of *S. atlanticus* provide an unequivocal way to distinguish males of these two spiders, and the sternal sigilla pattern separates females.

Virginia records (and those from farther north) of *S. rufipes* imply an eastern, lowland range:

Fairfax Co.: Falls Church, 1912 [exact date(s) not specified], Nathan Banks (MCZ 1♂/6♀); East Falls Church, 11 April 1909, Nathan Banks (MCZ 1♂/2♀).

Greensville Co.: pitfall site at end of Rt. 666, 1.2 miles E of Claresville, 25 May-30 June 1994 (2). *City of Virginia Beach*: First Landing (Seashore) State Park, 21 June 1989, K. A. Buhlmann (1).

SEASONAL ACTIVITY OF MALES

My previous treatment of this genus (Hoffman, 1992) provided a curious tabular distribution of three species by dates of collection. This approach was not optimal, aside from highlighting the early activity season of *S. coylei*. I now offer a somewhat better summary (Table 1) that indicates the actual numbers of specimens collected in specific months. No attempt was made to subdivide the data by locality, although it may be assumed that surface activity begins earlier in the eastern, warmer part of the state.

Table 1. Seasonal surface activity of *Sphodros* species in Virginia, as documented by pitfall trapping (number of specimens captured per month).*

<u>Species</u>	<u>March</u>	<u>April</u>	<u>May</u>	<u>June</u>	<u>July</u>	<u>Range</u>
<i>S. atlanticus</i>			13	27	1	3 May-1 July
<i>S. coylei</i>	12	133	20	1		25 March-15 June
<i>S. niger</i>			11	34	1	1 May-9 July
<i>S. rufipes</i>				3		21-30 June

*Actual capture dates were likely earlier than dates on which pitfall traps were checked.

ACKNOWLEDGEMENTS

It is a pleasure to express my gratitude to Dr. Norman Platnick (American Museum of Natural History) for advice and suggestions over many years in connection with atypids and many other spiders, examination of types at my request, and loans of specimens. Dr. Richard Bradley (Ohio State University at Marion) provided information on the occurrence of *S. coylei* in Ohio.

Virtually all of the specimens collected by DCR-DNH inventory work prior to 1992 were put into my hands by Christopher A. Pague, and after that date by his successor Steven M. Roble: my debt to these colleagues will be obvious.

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Shorter Contributions

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LATE GROUND NESTING OF MOURNING DOVE (*ZENAIDA MACROURA*) ON ASSATEAGUE ISLAND, VIRGINIA. — On 17 September 2009, I observed a pair of nestling Mourning Doves (*Zenaida macroura*) in a ground nest on Assateague Island, Chincoteague National Wildlife Refuge, Accomack County, Virginia. The nestlings, which appeared to be about 10 days old based on the extent of feather sheathing on the head and neck (Hanson & Kossack, 1957), were huddled in a shallow depression in pine needle litter (Fig. 1). The nest site was screened by a thicket of greenbriar (*Smilax* sp.) and shaded by tall loblolly pines (*Pinus taeda*). An irregular ring (ca. 30–35 cm in diameter) of feces around the nestlings indicated that the doves had been present at the site for several days, signifying a ground nest rather than a

post-fledging “reference area” (Grand & Mirarchi, 1988). Ground nesting occurs frequently in open habitats west of the Mississippi River (Cowan, 1952; Howe & Flake, 1989), but it is relatively uncommon in forested regions of eastern North America (Drobney et al., 1998). However, Hon (1956) found a substantial number of ground nests on small islands supporting few trees or mammalian predators off the coast of North Carolina. Ground nesting has been poorly documented in Virginia (Lewis, 1936). Given an incubation period of about 14 days (Hanson & Kossack, 1957), a laying date of 23 August can be inferred for the first egg of the customary two-egg clutch. This constitutes a moderately late date for Virginia and the Delmarva Peninsula (Clapp, 1997; Robbins & Blom, 1997).

One additional point deserves comment. I was struck by the resemblance of the compact nestlings to pine cones that littered the ground. Grayish plumage color and contrasting feather tips effectively mimic



Fig. 1. Nestling Mourning Dove (*Zenaida macroura*) in a ground nest on Assateague Island, Virginia, on 17 September 2009.

the imbricated scales of weathered, unopened cones. Although this highly adaptable species nests in a wide range of habitats in North America that lack pines, this incident suggests that the juvenal plumage may afford good camouflage in pine-dominated habitats.

I thank Roger Clapp for sharing his knowledge of the literature.

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Gary R. Graves
Department of Vertebrate Zoology, MRC-116
National Museum of Natural History
Smithsonian Institution
P.O. Box 37012
Washington, D.C. 20013-7012

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***GEOCORIS ULIGINOSUS*, A BIGEYED BUG (HEMIPTERA: LYGAEOIDEA: GEOCORIDAE) ASSOCIATED WITH *PHLOX SUBULATA* IN MID-APPALACHIAN SHALE BARRENS.** — Bigeyed bugs, so-called because of their prominent eyes (stylate or nearly so), were long placed as a subfamily (Geocorinae) of the family Lygaeidae. Geocorines now belong to a separate lygaeoid family, the Geocoridae, following division of a paraphyletic Lygaeidae into smaller, monophyletic families (Henry, 1997). *Geocoris uliginosus* (Say) is a common eastern North American species (Sweet, 2000) found statewide in Virginia from sea level to about 5,000 ft (1,525 m) on Mount Rogers (Hoffman, 1996). Species of *Geocoris* can be difficult to identify (Hoffman, 1996; Sweet, 2000), but *G. uliginosus* can be recognized east of the Mississippi (its range extends west to New Mexico and Texas; Ashlock & Slater, 1988) by its almost uniformly black coloration. Adults are oval with males about 3.3 mm and females about 3.5 mm long. This geocorid is found mainly around houses, along roadways, and in agroecosystems and other disturbed habitats (Readio & Sweet, 1982). Adults are fully winged (macropterous), which is typical of most species of *Geocoris* that occupy temporary habitats (Readio & Sweet, 1982; Sweet, 2000). *Geocoris uliginosus* has been studied mainly in managed systems such as field crops (Whitcomb & Bell, 1964; Roach, 1980) and turfgrasses, where the principal prey of this generalist predator are chinch bugs, *Blissus* species (Lygaeoidea: Blissidae) (Dunbar, 1971; Reinert, 1978; Carstens et al., 2008). Numerous other small arthropods serve as prey (Crocker & Whitcomb, 1980), including eggs and neonate larvae of the fall armyworm, *Spodoptera frugiperda* (J. E. Smith) (Braman et al., 2003). As in many other species of *Geocoris*, cannibalism is common under laboratory conditions (Readio & Sweet, 1982; Sweet, 2000). During times of low prey densities, the omnivorous *G. uliginosus* can switch to scavenging and phytophagy (Sweet, 1960; Crocker & Whitcomb, 1980; Readio & Sweet, 1982; Carstens et al., 2008). Some plant feeding, which does not damage plants (Crocker & Whitcomb, 1980), might be needed for optimal performance (Sweet, 2000). *Geocoris uliginosus* can live as long as four months on a diet of sunflower seeds and water (Sweet, 1960). This mainly geophilous bug is found less often on plants than are syntopic congeners such as *G. punctipes* (Say) (Crocker & Whitcomb, 1980; Readio & Sweet, 1982; Sweet, 2000).

Studies of *G. uliginosus* in natural communities and associations with plants lacking economic importance are scant. Adults have been recorded from weeds in crop fields or other disturbed sites (Uhler, 1877; Blatchley, 1926; Altieri & Whitcomb, 1979, 1980; Wheeler, 1981). Here, I give records of this bigeyed bug from moss phlox, *Phlox subulata* L. (Polemoniaceae), mainly in Virginia shale barrens, and notes on its seasonal history. *Geocoris uliginosus* was collected in mid-Appalachian shale barrens during irregular intervals from 1989 to 1995 by shaking mats of phlox over a shallow white enamel tray, as described by Wheeler (2009). That paper also included a brief description of mid-Appalachian shale barrens. When nymphs were determined to instar, Roman numerals in the following records designate instars, with the preceding Arabic numbers indicating how many of each instar were observed. Voucher specimens have been deposited in the National Museum of Natural History, Smithsonian Institution, Washington, DC.

Geocoris uliginosus on *Phlox subulata* in mid-Appalachian shale barrens:

MARYLAND: *Allegany Co.*, Country Club shale barren, Evitts Creek, Cumberland, 2 July 1994, 5 nymphs; Oldtown shale barren, E of Oldtown, 21 May 1995, 1-II, 2-III.

PENNSYLVANIA: *Bedford Co.*, Silver Mills shale barren, E of Inglesmith, 28 May 1992, 2-II.

VIRGINIA: *Alleghany Co.*, Potts Creek shale barren, Rt. 18, 2.5 km NE of Boiling Springs (17.0-17.5 km S of Covington), 4 June 1989, 2 adults; 2 June 1990, 1 adult; 23 June 1990, 1-I. *Highland Co.*, Head Waters shale barren, Rt. 616 nr jct. Rt. 250, 25 August 1990, 2 adults; 1 August 1993, 1 adult; 3 July 1994, 4 nymphs (instars III-V); 26 August 1994, 1 adult. *Montgomery Co.*, Flatwoods Rd. (Rt. 713), nr jct. Rt. 603, NE of Ironto, 18 April 1991, 1-I; 15 May 1993, 3-III. *Rockingham Co.*, George Washington National Forest, For. Rd. 87, W of Fulks Run, 1 October 1994, 2-V, 1 adult. *Shenandoah Co.*, Short Mountain shale barren, SE of Mount Jackson, 11 May 1991, 1-II; 12 April 1992, 1-I; 17-19 April 1992, 2-I, 1 adult; 17 May 1992, 1-I, 1-III.

WEST VIRGINIA: *Greenbrier Co.*, Kates Mountain barren, S of White Sulphur Springs, 23 June 1990, 1 adult.

Not all plants are colonized by *Geocoris* species even though they occupy suitable habitat for the bugs and harbor numerous potential prey (Crocker &

Whitcomb, 1980). *Geocoris uliginosus*, though not abundant (never >5 individuals/sample), was encountered consistently on *P. subulata* in shale barrens. The fact that nymphs of all instars were observed suggests more than an incidental association with the plant. Species of *Geocoris* oviposit on pubescent plant parts or in soil (Sweet, 2000). The presence in shale barrens of first instars of *G. uliginosus* suggests that eggs might be deposited on the glandular-hairy *P. subulata* or under mats of phlox. Adults of this geocorid overwinter (Froeschner 1944; Crocker & Whitcomb, 1980). In the present study, first instars were observed by mid-April in 1991 and 1992 in Shenandoah County, Virginia; a third instar was found in mid-May 1992 in this same county and early instars in late May in Allegany County, Maryland. Collection of a first instar in late June in Alleghany County, Virginia, suggests the beginning of a second generation. The mid- to late instars present in early July in Highland County, Virginia, might also belong to a second generation. Adults were found in shale barrens in early and late June, early and late August, and early October.

Even though species of *Geocoris* sometimes occur syntopically (Crocker & Whitcomb, 1980), *G. uliginosus* was the only geocorid collected from mats of moss phlox in shale barrens. *Geocoris uliginosus* tends to occur in shaded areas and xeric habitats, but also is found in open areas where the bugs occupy protected microhabitats such as crowns of bunchgrasses (Reado & Sweet, 1982; Sweet, 2000). Shale barrens are characterized by low surface moisture, as well as high irradiance and soil-surface temperatures (Platt, 1951; Keener, 1983; Braunschweig et al., 1999). The geocorid's use of the mat-forming *Phlox subulata* would provide shelter and a microenvironment with greater moisture and lower temperatures as compared to open areas of shale. Mats of moss phlox harbor an unusually diverse insect fauna, including hemipterans such as leafhoppers, plant bugs, psyllids, stilt bugs, and whiteflies (Wheeler, 1994; 1995a, b; 1997; 1999; 2009) that would provide potential prey for *G. uliginosus*. This bigeyed bug can be included with the reduviid *Fitchia aptera* Stål (Wheeler, 2000) among the few predacious insects associated with the numerous herbivores that feed on moss phlox in mid-Appalachian shale barrens.

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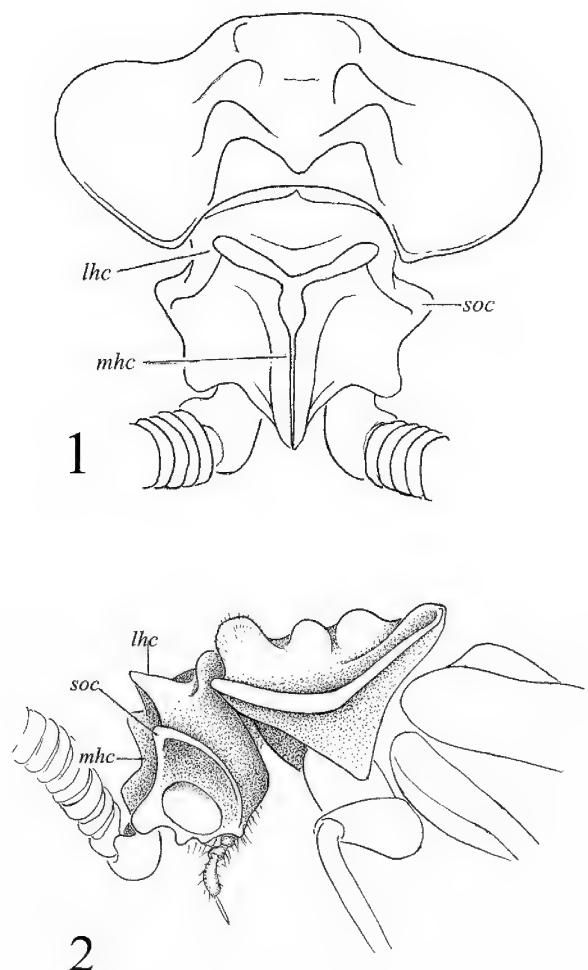
A.G. Wheeler
Department of Entomology
114 Long Hall
Clemson University
Clemson, South Carolina 29634-0315

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ECITOXENIDIA BREVICORNIS SEEVERS, A RARE MYRMECOPHILOUS BEETLE, OCCURS IN VIRGINIA (COLEOPTERA: STAPHYLINIDAE: ALEOCHARINAE: LOMECHUSINI). — Staphylinid beetles are prominent among the various arthropods that have adapted to an often precarious life as commensals in ant colonies. Although this relationship seems to be more frequent in the tropics, several species of host ants do occur as far north and east in the United States so as to be represented in Virginia; army ants (Formicidae: Ecitoninae) such as *Neivamyrmex* in particular are frequently involved in this kind of myrmecophily. A summary of North American staphylinids known at that time to occur with *Neivamyrmex* was published some decades ago by C. H. Seevers (1959), in which the genera *Microdontia* (4 species), *Ecitopora* (1), *Dinocoryna* (5), *Ecitonidria* (1), and *Ecitoxenidia* (3) are accounted, most of the 14 species being recorded from North Carolina, Alabama, Kansas, and Arizona. A later review of the Aleocharinae (Seevers, 1978) dropped *Ecitopora* (as of dubious status) but did not otherwise alter the 1959 roster. A subsequent paper by Frank & Thomas (1981) provided a Florida locality for *E. alabamae* and a detailed habitus illustration of the species that shows its essential identity with *E. brevicornis*.

In the local context, North Carolina was credited by Seevers (1959) to have the species *Dinocoryna bisinuata* (Casey), *D. schmitti* (Wasmann), *D. carolinensis* Seevers, and *Ecitoxenidia brevicornis* Seevers. The last two species were based on specimens found in colonies of *Neivamyrmex nigrescens* (Cresson) at Southern Pines; apparently neither has been collected subsequently. Since this ant conducts virtually all of its activities underground, it is not often collected and its biology is poorly known.

On 2 August 2008, a blacklight operated at a small stream in Patrick County, Virginia, captured a single specimen of a small beetle of such curious form that identification even to family was initially retarded. On seeing this specimen at a later date, Dr. Arthur V. Evans recalled a similar image figured in the chapter on Staphylinidae in "American Beetles" (Newton et al., 2001: 318, fig. 278.22). By direct comparison of this beetle with the holotype of *Ecitoxenidia brevicornis* in the Field Museum of Natural History, Dr. A. F. Newton was able to establish conspecificity of the two individuals. This fortuitous collection is apparently only the second time that this species has been found (A. F. Newton, pers. comm.); its range is thus extended some



Figs. 1-2. *Ecitoxenidia brevicornis* Seevers. Fig. 1. Head and pronotum, oblique anterodorsal aspect to show ornamentation of head. Fig. 2. Same specimen, lateral aspect of head and thorax. Abbreviations: *lhc*, lateral hyoid crest; *mhc*, median hyoid crest; *soc*, supraocular crest.

240 km northwest from Southern Pines, increasing the known beetle fauna of Virginia by another species.

Collection data are as follows: VIRGINIA: *Patrick Co.*: Mill Creek at Va. Rt. 628 bridge, ca. 1 mile west of Stella, 2 August 2008, R. L. Hoffman legit (VMNH 1). Two subsequent operations of a blacklight trap at this site, and two Berlese extractions of nearby soil and litter, failed to produce additional specimens of either the beetle or *Neivamyrmex* ants. However, since *N. texanus* is known from Virginia, and both *N. nigrescens* and *N. opacithorax* surely occur here (Snelling & Snelling, 2005; D. A. Waller pers. comm.), it seems likely that our knowledge of the instate distribution of both insects will eventually be improved.

The several illustrations of this species in Seevers's (1959) description show the general appearance of the animal adequately, but, because they were made in a dorsal aspect, fail to represent the actual complexity of the forebody ornamentation. To aid in recognition of any future captures, I provide here some drawings made from oblique and lateral aspects (Figs. 1-2). Seevers correctly noted the presence of a median hyoid ("Y-shaped") carina on the head and of two paramedian ridges on the pronotum, but these are more prominent than the dorsal view would suggest, and the supraocular carinae have not been previously mentioned.

In contrast, except for the greatly enlarged antennae with short, broad, discoid articles, the head and pronotum are essentially unmodified in the two species of *Dinocoryna* known from North Carolina. It is interesting to speculate on what selective factors – certainly including the host ants – have resulted in the structural innovations of *E. brevicornis*.

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Richard L. Hoffman
Virginia Museum of Natural History
Martinsville, Virginia 24112

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THE TAILED CELLAR SPIDER, *CROSSOPRIZA LYONI* (BLACKWALL 1867), NEW TO VIRGINIA (ARANEAE: PHOLCIDAE). — A population of an unusual-looking pholcid spider was initially observed by one of us (TC) around the overhead door of an indoor swimming pool in Kirby Athletic Center on the campus of Hampden-Sydney College, Hampden-Sydney, Virginia. A single female was collected and later identified as *Crossopriza lyoni* (Blackwall 1867). This species has not been recorded previously from Virginia, and has been found in North America only in Texas, Florida, Louisiana (Edwards, 1993), and Kansas (Guarisco & Cutler, 2003), making our collection the first for the northeastern United States as well.

VIRGINIA: Prince Edward Co. Hampden-Sydney College, swimming pool facility, Kirby Athletic Center, 22 October 2010, T. Clark leg. 1♂, 3♀. Specimens deposited in the Virginia Museum of Natural History, Martinsville, Virginia.

Our specimens of *C. lyoni* were taken in company with the ubiquitous pholcid *Pholcus phalangioides*, but were obviously distinct. *Pholcus phalangioides* is a pale spider with an elongate abdomen, whereas *C. lyoni* is darker grayish-brown, with a subglobular abdomen distinguished by a prominent dorsoposterior tubercle, which forms the “tail” referred to in the vernacular name. Illustrations and a detailed description of the spider may be found in Huber et al. (1999) and at several websites. Like *P. phalangioides*, *C. lyoni* is a synanthrope that colonizes buildings. In addition to many localities in southeast Asia (probably its native range), Huber et al. (1999) have recorded the species from Argentina, Australia, Brazil, India, Mali, Nicaragua, Nigeria, Paraguay, the Philippines, and Sri Lanka. Additional species of *Crossopriza* have been described from the New World, but according to Huber et al. (1999) all are synonyms of *C. lyoni*.

Strickman et al. (1997) studied individuals of this species in Thailand and found them to be predators of the mosquito *Aedes aegypti*, a vector of dengue fever. The spiders did not become hosts of the dengue virus, and because they commonly occur in buildings, including homes, the authors concluded that *C. lyoni* could be an important part of an integrated mosquito control strategy.

A search of the swimming pool room revealed a significant, established population of *C. lyoni*. We observed several mature females, a mature male, and many juveniles of various instars. The females and juveniles were in large, loosely organized sheet webs that were distinct from the tangled webs of co-occurring *P. phalangioides*. In the pool area, only three individuals of *P. phalangioides* were seen, suggesting that in this local context, *C. lyoni* may have been out-competing it.

Our new record of *C. lyoni* and those from other North American sites demonstrate that this species can colonize buildings and survive well away from the tropics. For our population, the high humidity and temperature maintained in the swimming pool duplicated the wet tropical environment in the spider’s native land. However, we suspect that *C. lyoni* is much more widespread and more adaptable than current records indicate.

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Travis Clark and William A. Shear
Department of Biology
Hampden-Sydney College
Hampden-Sydney, Virginia 23943

Historical Contributions

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“Historical Contributions” is a new section of *Banisteria* devoted to reprinting short narratives of relevance to the natural history of Virginia. For this first installment, I have selected a few observations made by John Banister (1650-1692), the first university-trained naturalist to work in Virginia. More details about his life, writings, illustrations, and collections can be found in the publications by Ewan & Ewan (1970, 1992).

The following excerpts are from a paper that was originally published more than three centuries ago (1700-1701). *Philosophical Transactions of the Royal Society of London* 22: 807-814). The insects described by Banister (in 1680) include mud dauber wasps, carpenter bees, cockroaches and wood roaches, bed bugs, fireflies (lightning bugs), and glow worms (firefly larvae). Comments in italics are those of James Petiver (1663-1718). Some of the following text was published in slightly different format in Ewan & Ewan (1970), occasionally containing additional words or sentences lacking from the journal version prepared by Petiver.

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Steve Roble, Editor, *Banisteria*

**IV. Some Observations concerning Insects made by
 Mr John Banister in Virginia, A. D. 1680.
 with Remarks on them by Mr James Petiver,
 Apothecary and Fellow of the Royal Society.**

Vespæ Ichneumones. Here are divers kinds, long and slender wasted all, these make their Nests of Dirt, and are therefore called *Dirt Wasps*. Some of them make their Nests contiguous to one another, each adjoyning Cavity having in it 2 or more partitions. Others build them in clamps one upon another; they fix them against a Wall or Ceiling of an house, or any where where dry. There is not above 2 *Wasps* belonging to one of these *Vespary's*, for when they have made one Cell, and put into it 6 or 8 live *Spiders*, they close it up to work upon another, leaving them to brood upon their young, something like that of *Aristotle* in his *Hist. Animal.* Lib. 1. cap. 20.

The young ones of these are cased over with a thin transparent horny skin of an Amber colour; those of the other are contained in a brown case, with a certain number of regular protuberances at one end thereof, *some* again lyce in brown ones that are *smooth*, and *some* (if I mistake not) *naked*. I have not had leisure this year to inquire so far into their *generation, production, &c.* as I would, *vid. Mart. Lister Hist. Animal*, cap. 5. libr. de *Araneis* in genere.

Bombylus Teredo. These Bees eat into *Timber*, and there make their *Nests*. This was in the *Joyce of a House* so firm and sound, that it was very hard entring with a Peircer, the hole was but just big enough for the Bee, to creep in at, and went right up, about 2 inches in the Wood, and then in a transverse line at least half a foot on each side, which seem'd to me (as I probed it with a knitting Needle) to be twice as wide as the entrance, how many Bees belonged to it I cannot tell, ³ there was in, and I heard one or two about the door.

Blattæ. These *Cockroaches* are one of the Plagues of this Country. They are *Oviparous* strange and large, that had I not seen one half extruded, I should not have believed them theirs.

Blatta Volans. These are very rare, I have seen but this one here.

Cimices. Wall-lice. These are another of our Plagues, for where there is not great care taken to destroy them, they are as numerous in our Beds, as the former are in our Kitchens.

Cicindela mas. The Fire-fly.
Cicindela Mariana vaginis teneris fuscis marginibus fulvis
Act. Phil. 246. p. 397. 16.

This is not that great *Virginian* kind, whose head shines, nor is it that smaller one, which *Piso* says the *Brazilians* call *Memoa*, nor the common kind, tho' much of that shape and size. This emits its light at 2 Crescents, but the whole tail of ours shines, which it contracts and dilates at its pleasure. Its sheath wings are of a dark purple edged with yellow, and so is its head or helmet.

This is exactly described, and the same with those of Carolina and Maryland from both which places I have received several of them. Yet amongst those from Carolina, which my ingenious Friend Mr Edmund Bohun sent me, I find a variety, whose sheaths were wholly blackish, but the Helmet edged with yellow: This I call Cicindela Caroliniana vaginis omnino nigrantibus.

Cicindela Fæmina. The Glow-worm. Is armed *Back* and *Head* in Joynt Armour of a deep *Murray* colour fastened to the *Thorax*; The *Tail* made of 9 shelly rings, in the last of which are visible the 2 shining points. Its *Head* is black, so small one cannot without the help of a *Glas*, perfectly discern the contexture of it. Its *Eyes* (if it have any) like those of a *Snail*, stand on the tops of 2 horns. It has 6 legs.

Miscellanea

Reviews

Remarkable Trees of Virginia, by Nancy Ross Hugo & Jeff Kirwan; photography by Robert Llewellyn. 2008. Albemarle Books, Earlysville, VA (distributed by University of Virginia Press, Charlottesville). 206 pp., 30 x 28 cm, ca. 160 color photographs (plus six black and white). ISBN 978-0-9742707-2-2 (cloth; \$49.95).

This large coffee table book features well-written narratives and stunning color photographs of more than 100 of the most “remarkable” trees found in Virginia. As noted by the authors, about 20 of these trees would appear on virtually anyone’s list of the 100 most remarkable trees in the state. Their task was to sift through more than 1,000 nominations provided by the general public, as well as other trees identified by their own research, to find the other 80 or so to include in the book. The chapter titles reveal the diverse criteria that were considered when selecting the state’s remarkable trees (numbers included are listed in parentheses): Old Trees (9), Historic Trees (12), Champion Trees (14), Community Trees (11), Unique Trees (10), Fine Specimens (11), Noteworthy Species (18), Mighty Oaks (14), and Tree Places (six categories such as cemeteries, college campuses, botanical gardens, parks, and national forests). Featured trees range from native species found in old growth forests and remote swamps to non-natives planted in urban parks and yards.

The book is the result of a four-year effort by noted lecturer and outdoor writer Nancy Ross Hugo, Virginia Tech Department of Forestry extension specialist and professor Jeff Kirwan, and photographer Robert Llewellyn to document Virginia’s largest, oldest, most historic, beautiful, and otherwise interesting (even unusual) trees. They reportedly traveled over 20,000 miles (Kirwan walked 300 of them) to research, locate, and photograph the trees considered for and ultimately included in this book. Examples of large trees include national champions (defined as the largest specimen of a particular tree species based on a scoring system that considers height, circumference, and crown spread) such as an overcup oak in Isle of Wight County, eastern arborvitae in Alleghany County, and osage orange at Patrick Henry’s Red Hill property in Charlotte County. Readers learn that Virginia ranks 5th nationally in terms of the number of state champions (56) that are also national champions. The authors note that champion trees are dethroned more often because a larger tree is discovered than because of the death or loss of part of the tree. In fact, several new champion trees were discovered in Virginia while this book was in

preparation. Champion tree hunter Byron Carmean is recognized for his efforts in Virginia. Featured old trees include stunted red cedars on limestone cliffs along the New River in Giles County that are more than 450 years old (see also Larson, 1997) and huge bald cypresses along the Blackwater River in Southampton County that exceed 800 years old. Historic trees include a tulip poplar planted by Thomas Jefferson in 1807 at Monticello and several trees with connections to Civil War sites or slavery. Unique trees include hollow, bizarre-shaped water tupelos and a massive sycamore leaning at a 45° angle with no signs of falling over.

The authors discuss many interesting topics in their narratives about specific trees. For example, they lament the loss of the once-dominant American chestnut and briefly describe current efforts aimed at trying to restore this species. The widespread declines of elms, hemlocks, and dogwoods are also mentioned. They discuss urban forests and the strategies proposed by communities to maintain and protect their trees.

The book affords its readers the opportunity to visit different parts of the state with the goal of trying to track down particular trees described in the text and see them “in the flesh.” However, the text often does not provide precise locations of the trees, so additional research is needed in many cases. Some of the trees grow on properties that are closed to the general public, whereas others are in front lawns or beside municipal buildings and schools. My family has already traveled to see some of the trees described in the book, such as the historic, sprawling cucumber magnolia outside of Robert E. Lee’s Civil War headquarters in Colonial Heights, the red mulberry in the Children’s Garden at Lewis Ginter Botanical Garden in Richmond, and the willow oak in an office park in Midlothian, as well as Jefferson’s tulip poplar at Monticello and the former national champion of this species in a tiny park in Bedford that is now surrounded by a chain link fence and residential neighborhood and drastically pruned in recent years due to safety concerns, reducing it to a mere skeleton of its once mighty stature. Although sight of the latter verged on depressing, I have also had the good fortune to see the enormous, awe-inspiring bald cypresses and large water tupelos that grow along the Blackwater River at The Nature Conservancy preserve near Ivor. Like many people, I suspect that I have passed by some of the remarkable trees featured in this book without giving them much notice (e.g., several along the Blue Ridge Parkway). I will pay them more attention the next time we cross paths.

The authors have succeeded in meeting their goal to “educate the public about Virginia’s finest trees and

their importance." The fact that this book is already in its 3rd printing attests to its widespread appeal among naturalists, botanists, arborists, foresters, landscapers, gardeners, historians, artists, photographers, and many others who appreciate trees. Purchase a copy for yourself or a relative or friend, enjoy it, and then make plans to visit some of Virginia's most remarkable trees.

As a postscript, I should note that the state's largest (and possibly one of its oldest, perhaps as much as 800-1000 years) known tree at the time of the book's publication, a huge bald cypress tree dubbed "Big Mama" that grew along the Nottoway River in Southampton County died in 2008. However, the "Lost Forest" in which it and many other very large and old trees were found in 2005 is now protected as part of the new Cypress Bridge Swamp Natural Area Preserve.

Literature Cited

Larson, D. W. 1997. Dendroecological potential of *Juniperus virginiana* L. growing on cliffs in western Virginia. *Banisteria* 10: 13-18.

Steve Roble
Editor, *Banisteria*

Checklist of the Vascular Plants of Plummers Island, Maryland, by Stanwyn G. Shetler, Sylvia S. Orli, Elizabeth F. Wells, & Marcie Beyersdorfer. 2006. Contribution XXIX to the Natural History of Plummers Island, Maryland. *Bulletin of the Biological Society of Washington* 14. 58 pp. (\$15)

The Invertebrate Fauna of Plummers Island, Maryland, edited by John W. Brown. 2008. Contribution XXX to the Natural History of Plummers Island, Maryland. *Bulletin of the Biological Society of Washington* 15. 226 pp. (\$35)

(These publications can be purchased from the Biological Society of Washington; see the society's website at <http://www.brynmawr.edu/biology/BSW/>).

The Washington Biologists' Field Club: Its Members and its History (1900-2006), edited by Matthew C. Perry. 2007. Washington Biologists' Field Club, Washington, DC. x + 342 pp. (A complete pdf version is available at: http://www.pwrc.usgs.gov/resshow/perry/bios/WBFC_books.pdf).

Plummers Island, a small (4.8 ha) island along the Maryland shore of the Potomac River about 15 km upstream of Washington, D.C., is one of the best-

studied field sites in the mid-Atlantic region. Members and guests of the Washington Biologists' Field Club, including many past and present scientists associated with the Smithsonian Institution's National Museum of Natural History, have been inventorying the biota of the island and adjacent mainland since 1901. The club gave the island to the National Park Service (under threat of eminent domain) in 1959 in exchange for exclusive access, and established a research and publication fund with proceeds from the sale of the mainland parcel to the NPS. Nearly 400 articles, ranging from short notes to monographic studies, have been published concerning the fauna and flora of the area. Many of these papers, including thirty in a series entitled "Contributions to the Natural History of Plummers Island, Maryland", have appeared in the *Bulletin* or *Proceedings* of the Biological Society of Washington. The first two papers cited above are significant additions to the body of knowledge of the area's biota.

The 2006 plant checklist updates previous lists (1935, 1953) of the vascular flora of the area and accounts for 885 species, including 76 known only from the mainland site. Of the total, 703 (79%) are native, 182 (21%) introduced, and 92 are new records for the Plummers Island area. The authors found 300 species during 2003-2005, and estimate that the current flora totals about 350 species. Many species, including bloodleaf (*Iresine rhizomatosa*), originally described based on collections from the island, have been lost due mostly to natural habitat changes (succession). The history of floristic work at Plummers Island, changes in the vegetation cover and flora during the past century, including discussions of the present plant communities and known deliberate introductions, are included within the pages of this important botanical work.

The vertebrate fauna of Plummers Island has been well-documented in previous publications but relatively little attention has been paid to the invertebrates. Notable exceptions include studies on bees, ground beetles (Erwin, 1981), and tortricid moths (Brown, 2001). According to a summary included in the 2008 volume edited by John Brown, more than 3,000 species of insects in 253 families and 18 orders have been recorded from Plummers Island. Insect orders treated in the 29 papers contained within this multi-authored volume include the Neuroptera (antlions, lacewings, and relatives), Megaloptera (dobsonflies and fishflies), Coleoptera (eight families of beetles), Mecoptera (scorpionflies), Trichoptera, (caddisflies), Lepidoptera (butterflies, skippers, and selected families of moths, including a paper on caterpillars), Diptera (Ephydriidae – shore flies), Siphonaptera (fleas), and Hymenoptera (bees and sawflies only). Some of these orders are represented by only a handful of species, whereas

hundreds of moths are reported. Other invertebrate groups treated in this volume are the nematodes, planarians, snails, freshwater mussels and clams, crustaceans (copepods, terrestrial isopods, crayfishes, and entocytherid ostracods), and pseudoscorpions. The appendix contains a complete list of the invertebrate species recorded from Plummers Island to date.

A summary paper concludes that the insect fauna of the island generally appears to be tracking changes in the vegetation and overall habitat. Species richness of insects that require early successional habitats has declined during the past century, whereas groups that feed on woody vegetation have remained fairly stable.

A related, recent publication of interest concerns the Washington Biologists' Field Club itself. Since its founding in 1900 there has been a total of 267 members, representing all branches of science, with a strong emphasis on biology. Active members must be residents of the greater Washington metropolitan area. Women, of which there are 10 current members, were first admitted into the club in 1995. Club members have included some of the world's leading authorities on plant and animal taxonomy, as well as major figures in conservation, and fish and wildlife management. Besides Smithsonian museum staff, they include employees of government agencies such as the National Park Service, Forest Service, Fish and Wildlife Service, Geological Survey, and National Zoo, as well as private organizations like The Wilderness Society, The Wildlife Society, Urban Wildlife Center, and the Wildlife Management Institute, plus professors at local colleges and universities. Past honorary members have included Nathaniel Britton, John Burroughs, George Grinnell, and Leonard Stejneger. Regular members (some awarded honorary status later) have included such well-known figures as Durward Allen, Vernon Bailey, Herbert Barber, Terry Erwin, Albert Fisher, Alfred Gardner, Charles Handley, Horton Hobbs, Ronald Hodges, Albert Hitchcock, Hartley Jackson, Karl Krombein, Roy McDiarmid, Brooke Meanley, Joseph Morrison, Roger Tory Peterson, Gifford Pinchot, Stanwyn Shetler, Paul Spangler, Francis Uhler (an active member for 61 years until his death), Ernest Walker, Walter Weber, Alexander Wetmore, Don Wilson, and Willis Wirth. Distinguished guests have included Frank Chapman, William Douglas, Theodore Roosevelt, John Terborgh, and Ernest Thompson Seton. Annual social events of the club for the past century have included a spring shad bake and a fall oyster roast. Memorial plaques have been placed on the island for 14 members and the ashes of several of them are scattered there. Past and current long-term members with strong Virginia connections include Handley, Hobbs, Walter Bulmer, Ralph Eckerlin, and David Johnston.

As stated in the preface, this book was published mainly for the benefit of the current Club members. It contains biographies or autobiographies of all past and current members. Some of the biographies were previously published as obituaries in scientific journals, and many make for interesting reading. For example, I learned that Smithsonian malacologist Joseph Morrison was orphaned as a child while living in the Congo, collected many groups of animals besides snails and mussels, and would often brag that he used dust shot to collect dragonflies on the wing. Mason Hale and James Lawrey conducted their pioneering, long-term research on the effects of air pollution on lichen populations at Plummers Island. Terry Erwin's long-term studies of rain forest insects were initiated in part because a Smithsonian administrator substituted the word "Panama" for "California" in his first major grant proposal. William Emery died at age 83 from a fall while collecting plants alone along Difficult Run in Fairfax County (a bush he had grabbed to prevent his fall was still in his grasp when his body was found three days later). The biography of Charles Handley provides an excellent complement to the tribute published in *Banisteria* after his death a decade ago (Pagels, 2000).

An appendix to this publication includes a tally (by major taxonomic groups) of the documented biota of Plummers Island, accounting for 4,835 species, including 221 fungi, 353 vertebrates, 597 beetles, 617 flies, 828 butterflies and moths, and one springtail (undoubtedly an under-sampled group).

I would encourage everyone with an interest in the biota of the mid-Atlantic region to obtain copies of these three publications.

Literature Cited

Brown, J. W. 2001. Species turnover in the leafrollers (Lepidoptera: Tortricidae) of Plummers Island, Maryland: Assessing a century of inventory data. *Proceedings of the Entomological Society of Washington* 103: 673-685.

Erwin, T. L. 1981. Natural History of Plummers Island, Maryland. XXVI. The ground beetles of a temperate forest site (Coleoptera: Carabidae): an analysis of fauna in relation to size, habitat selection, vagility, seasonality, and extinction. *Bulletin of the Biological Society of Washington* 5: 103-224.

Pagels, J. F. 2000. Charles Overton Handley, Jr.: A remembrance. *Banisteria* 16: 51-54.

Steve Roble
Editor, *Banisteria*

Weevils of South Carolina (Coleoptera: Nemonychidae, Attelabidae, Brentidae, Ithyceridae, and Curculionidae) by Janet C. Ciegler. 2010. Biota of South Carolina, Volume 6, 276 pp. \$40.00. Available from the Public Service Bulletin Room, 96 Poole Agricultural Center, Clemson University; purchase information can be found at <http://www.clemson.edu/psapublishing>.

On commencing a review of Janet Ciegler's latest contribution to the knowledge of South Carolina's beetles, I find myself in the position of a systematist who, after having bestowed the name *maximus* on a new species of organism, is confronted with a specimen of another even larger novelty in the same genus. Having exhausted my supply of superlatives in a review of her earlier (2000) treatment of the carabid beetles of that state, I am at a loss for words appropriate for an even better account of the weevils, the sixth part of an admirable series of state faunistic surveys being produced by Clemson University. From the eye-catching portrait of a gorgeous *Sphenophorus* on the front cover to the colorful menagerie of diverse species on the outside back, the tradition of high quality practical usefulness is strictly upheld, even enhanced.

The 276 pages that lie between these covers provide a descriptive account of 522 species in 181 genera -- referable to the five weevil families stipulated in the title -- that either are documented for South Carolina or are very likely to occur there. This is an impressive roster, even so it is not a complete list of the state's Curculionoidea (see comments in a subsequent paragraph). The format follows that established in preceding volumes: keys to taxa at all levels, short descriptive notes or diagnoses for each genus, tribe, and subfamily, and two clear photographs of a representative of each genus. That so many of them depict weevils only a few millimeters long in sharp focus is a testimony to Ms. Ciegler's skill with a digital camera. Familiarity with these pictures has already saved me a lot of frustrating "key time".

The introductory pages provide an overview of the physiographic and ecological regions of the state, and the very useful "Appendix A" lists 351 (!) collecting sites by county and physiographic province. In recognition of the known host plant specificity of many weevils, "Appendix B" is a seven-page concordance of the plant species mentioned throughout the book, by scientific name, vernacular name, and family taxon name. "Appendix C" documents 121 new additions to the known weevil fauna of South Carolina, and last, but not least, "Appendix D" accounts for 84 species associated with aquatic or semiaquatic habitats.

No effort has been spared in providing labeled line drawings of every character used in the keys (even the

antennomeres in the funicle are numbered), a vast improvement over the less user-friendly accounts in the classical old resource by Blatchley & Leng (1916). These graphics are supplemented by a three-page glossary defining every structure or condition mentioned in the keys.

While my review of the carabid volume was written from the standpoint of someone with a working knowledge of eastern Nearctic ground beetles, the following remarks are those of an admitted neophyte in the world of weevils, therefore a member of the consumer group to the needs of which the book is specifically addressed. Therefore, the final test of the book's success lay in whether I could identify Virginia weevils with it. With the aid of a handicap (starting with a genus I already knew, *Sphenophorus*), I have had general success in the several trials, although admittedly my selections have favored species more than 3 mm in length. So far about the only point of any concern is the use of the term "flattened" in the definition of the Cossoninae (many of which seem quite cylindrical to me).

I may allude to a curious loose-end, the absence of some genuine weevil taxa. On page 19 it is explained that the brentid subfamily Apioninae was omitted because its species are minute and hard to identify, and an existing monograph on the group already exists. This rationale is reasonable; I would never try to identify an apionid anyway. But I found no commentary about the exclusion of scolytids, which are traditionally considered to be weevils even though they lack the trademark rostrate prolongation of the head. More striking is the unremarked omission of the Anthribidae, good card-holding weevils by any definition, and neither numerous nor hard to identify. Their inclusion would surely have required less effort than groups like Erirhininae. Perhaps treatment of this, or these, groups is in preparation or anticipated, but one wishes that a statement had been made upfront on page 1.

Having produced somewhat similar (but much smaller) faunistic synopses of several insect families in Virginia, I am well aware of the enormous investment of time and effort required to produce the present volume and its predecessors, from the field work right on through composition of the text and preparation of the graphics. Ms Ciegler's contributions maintain the high standard of useful and authoritative identification manuals in the tradition of W. S. Blatchley, earning the appreciation of everyone for whom identification of southeastern beetles has been made easy and possible. And lastly, one cannot overlook the signal contribution by Clemson University in producing the series "Biota of South Carolina" and by Dr. A. G. Wheeler, supervising editor of the project.

Literature Cited

Blatchley, W. S., & C. W. Leng. 1916. Rhynchophora of Weevils of North Eastern America. The Nature Publishing Company, Indianapolis. 682 pp.

Hoffman, R. L. 2000. *Review of* J. C. Ciegler. 2000. Ground Beetles and Wrinkled Bark Beetles of South Carolina (Coleoptera: Geadephaga: Carabidae and Rhysodidae). *Banisteria* 16: 55-58.

Richard L. Hoffman
Virginia Museum of Natural History
Martinsville, Virginia 24112

Reports

1. President's Report

This is my final report as President of our society. I am pleased to turn over the reins to the capable talents of Ralph Eckerlin, a longtime member and supporter of the Virginia Natural History Society. Thanks to Ralph for taking on this responsibility and also to Michael Lachance for his contributions during his term as councilor.

As indicated in Bill Shear's reports below, our society remains financially strong but membership has declined significantly in recent years, a trend that is not uncommon among professional societies these days. To assist in increasing our membership, we are asking all members to encourage their colleagues with an interest in natural history to join the Society. We will also be making efforts to encourage our state colleges and universities to begin subscriptions to *Banisteria*. In that regard, we would like all current members associated with Virginia institutions to contact their librarians about *Banisteria* (minimally, provide a photocopy of the order form on the inside back cover). Requests from faculty are often the best approach for getting journals approved for libraries. For your information, the following institutions currently subscribe: Sweet Briar, Mary Washington, W&L, NOVA, W&M, Lord Fairfax CC, University of Richmond, VA Tech, Longwood, George Mason, Hampden-Sydney, Christopher Newport, Salisbury, Clemson, Duke, the Library of Virginia, and the National Museum of Natural History (Smithsonian Institution). The annual cost to institutions is only \$40.00, certainly a bargain by any measure.

Finally, I would ask all those who presented a paper at the "Historical Explorations into Virginia's Natural History" symposium to contact Joe Mitchell

(dr.joe.mitchell@gmail.com) about your plans for completing a manuscript for publication.

Respectfully submitted,
C. Barry Knisley, President

2. Minutes of the December 2010 Virginia Natural History Society Council meeting

The 2010 meeting of the Executive Committee of the Virginia Natural History Society was held in Settle Hall, Hampden-Sydney College, Hampden-Sydney, Virginia, on December 4th, 2010. In attendance were Bill Shear, Barry Knisley, Richard Hoffman, Steve Roble, Lisa Williams, Ralph Eckerlin, Tom McAvoy, Michael Kosztarab, and Mike Lachance. The meeting was called to order by President Barry Knisley at 12:35 PM.

The minutes of the 2009 meeting and the report of the Secretary-Treasurer were approved unanimously. Membership presently stands at 105 (including 17 institutional members), and the treasury contains \$7,182.62. The Secretary-Treasurer's full report is appended to these minutes.

Following these reports, discussion moved immediately to the declining membership and ways to reverse that trend. Because institutional memberships are more lucrative, it would be important to convince more institutions to subscribe. Barry Knisley said that he would contact Biology Departments across Virginia to ask them to request that their libraries subscribe.

Ralph Eckerlin talked about the relationship between VNHS and the Virginia Academy of Science. He noted that the Society helped to create the Natural History and Biodiversity section of the Academy, and that recently that section has been poorly attended at meetings of the Academy. The association may have broken down because participation in Academy meetings requires membership in the Academy.

Mike Lachance mentioned that he had met with the director of the Virginia Master Naturalist program. Later in the meeting, he volunteered to obtain a list of Master Naturalists in order that they might be asked personally to join VNHS. Bill Shear suggested that the opportunity for the Master Naturalists to collaborate with professional biologists might be attractive to them both.

Michael Kosztarab suggested that the Committee members might be given extra copies of *Banisteria* to distribute to colleagues, in the hope the colleagues might join the VNHS. Mike LaChance wondered if some kind of "advertisement" in *Southeastern Naturalist* might draw members from both in and out of

the state. Do we have a presence at the meetings of other, similar societies in Virginia? Mike also thought a Facebook page for the VNHS might be helpful. He volunteered to investigate these things.

Bill Shear said that an annual general meeting of the membership might be an additional benefit for members that could prove attractive. Such a meeting could include a keynote speaker, a paper session, a field trip, and opportunities for members to socialize. Ralph Eckerlin agreed to investigate the possibilities of holding such a meeting sometime in 2011 in northern Virginia.

Tom McAvoy thought that an electronic newsletter, appearing between issues of *Banisteria*, could be helpful and also suggested that an electronic survey of the membership should be undertaken to determine the wants and needs of members. Bill Shear and Mike Lachance were asked to develop such a questionnaire and submit a draft to the Committee.

Steve Roble reported on progress on *Banisteria*. Number 36 will appear in early 2011; #37 should be out in May or June. Delays in receiving reviews and in authors revising their manuscripts accounted for much of the holdup in the appearance of the fall issue of the journal, but if all goes well, #37, a spring issue, will actually appear in the spring of the year for which it is intended. A discussion of possible additions to the content of *Banisteria* took place, and several suggestions were made, such as collecting phenological data from members with an eye toward a long-term monitoring survey of responses to global climate change, profiles of historically prominent Virginia naturalists, reprinting narratives of historic field trips (Richard Hoffman has already unearthed two examples, which he agreed to edit and send to Steve Roble). Bill Shear suggested perhaps more articles that would be of interest to the amateur members, such as reviews of topics related to Virginia natural history, or perhaps a section at the front of each issue, "In This Issue" which would present brief summaries of the contents in layman's terms. Steve Roble reminded the Committee that for all of these suggestions, someone would have to take the responsibility of compiling or editing the material. There seemed to be general agreement that *Banisteria* was the most important benefit members received and any enhancements would be most helpful in retaining members.

There followed discussion of the possible publication of the papers from the "Historical Explorations into Virginia's Natural History" symposium held in September 2009. Barry Knisley had spoken recently with Joe Mitchell, who had volunteered to edit the symposium papers and learned that only two manuscripts have been received to date. Originally,

three options for publication had been considered: 1) a book, with linking commentaries by Joe Mitchell, 2) publication through the Virginia Museum of Natural History, and 3) a special issue of *Banisteria*. The Committee agreed that each of these alternatives seemed increasingly unlikely. Richard Hoffman noted that the Museum has no funds for such a publication. The general thinking of the Committee was that the best alternative was to publish the manuscripts as separate articles in *Banisteria* as they were accepted. Barry Knisley will discuss this option with Joe Mitchell.

Candidates are needed for two positions, Vice President and Councilor. The Committee agreed to propose Todd Fredericksen for Vice President and Richard Groover for Councilor.

President Barry Knisley adjourned the meeting at 2:40 PM.

Respectfully submitted,
William A. Shear, Secretary/Treasurer

3. Secretary-Treasurer's Report

As of December 3, 2010, the society has 105 members, including 17 institutional members. This represents a decline in membership from November 2009 (122 members, 18 institutions) and December 2008 (133 members, 19 institutions). Membership has declined over the past five years from the most recent high point in 2004, when we enrolled 165 members and 22 institutions. This is an approximate 36% decline to the current number. Not only is our membership declining, but the rate of decline itself is accelerating.

Our current bank balance is \$7,182.62, about the same as our balance one year ago.

Respectfully submitted,
William A. Shear, Secretary/Treasurer

4. Webmaster's Report

VNHS website traffic during the past six months is summarized in the following table:

Month	Page Loads	Unique Visitors	First Time Visitors	Returning Visitors
Jun 2010	84	67	55	12
Jul 2010	33	27	9	18
Aug 2010	109	88	18	70
Sep 2010	11	8	2	6
Oct 2010	11	8	3	5
Nov 2010	83	60	11	49

DEFINITIONS:

Page Loads - The number of times the VNHS front page was visited.
Unique Visitors - Total number of visitors (first time plus returning).
First Time Visitors - First time visitor to the VNHS website.
Returning Visitors - A person returning to our website for another visit in an hour or more later.

Location of recent VNHS visitors:



We would like to thank the Conservation Management Institute (www.cmiweb.org) for hosting the VNHS website.

Respectfully submitted,
John White, Webmaster

5. Editor's Report

The lead article of this issue of *Banisteria* represents the first detailed report on the robber flies of Virginia, a diverse group of predaceous insects with more than 100 representatives in the state. The author, Paul Bedell, is a professional musician (member of the Richmond Symphony Orchestra), a former councilor of the Virginia Natural History Society, and a top-notch "amateur" naturalist. Like many naturalists, he was first attracted to and mastered birds. In the past two decades he has become an expert on dragonflies and damselflies and is also well-versed on butterflies and skippers. About five years ago, Paul became interested in robber flies, and began his ascent from novice to expert. Through a combination of field sampling (including a keen eye and fast net swing), museum visits, an extensive literature search to accumulate numerous papers needed to identify specimens, evaluation and use of on-line identification resources, and the examination of several thousand specimens, he has largely mastered the regional fauna. His success should serve as motivation to other "amateur" naturalists who desire to make important contributions to the natural history of Virginia and this journal.

As noted in the minutes printed above, at the December 2010 executive committee meeting, discussion ensued concerning possible additions to the content of *Banisteria*. I welcome input from members of the society on this matter. Possible ideas include

publishing a brief (1-2 page) profile of one native Virginia species (could perhaps be limited to endemic species, or endangered and threatened species, though not necessarily so) in each issue and/or a nature reserve, state natural area preserve or other destination of interest to naturalists and biologists. Other ideas include publishing profiles of historically (or perhaps even currently) prominent Virginia naturalists and reprinting narratives of historic field trips or other interesting historical papers pertaining to the natural history of Virginia. In this context, a new section entitled "Historical Contributions" is being initiated with this issue. The first installment features a few selected writings of John Banister (1650-1692) concerning insects. Several other papers describing historic field trips or interesting historical papers are currently under consideration for future issues of *Banisteria*. I would welcome suggestions for additional historical accounts related to Virginia's natural history that you believe would be of interest to other members of our society.

I have already received about five submissions for the spring issue that are currently in review or being revised by the authors. I will strive to get it printed by June. Submissions are currently needed to complete that issue, but more so for the fall 2011 issue. Finally, I would like to thank associate editor Tom Wieboldt for soliciting peer reviews of the paper concerning Caroline County butterflies that appears in this issue, and associate editor Richard Hoffman for his many submissions, advice, and encouragement.

Respectfully submitted,
Steve Roble, Editor, *Banisteria*

Announcements

1. Membership Renewals and Election Ballot

A membership renewal notice for *Banisteria* numbers 37 and 38 (2011) is enclosed with this issue. You will also find a ballot for the election of the society's next Vice President and a councilor to replace Michael Lachance, whose 4-year term expires in December 2010. Please return the ballot by April 1, 2011 to Dr. William A. Shear, Secretary/Treasurer.

2. Virginia Academy of Science - 2011 Meeting

The 89th annual meeting of the Virginia Academy of Science will be held at the University of Richmond on May 25-27, 2011. Titles for presentations in the Natural History and Biodiversity section must be

submitted to section secretary Nancy Moncrief (276-634-4177; nancy.moncrief@vmnh.virginia.gov) by February 11, 2011 (abstracts are due later). Oral and poster presentations will be scheduled for May 26. Presenters must be members of the Academy and registered for the meeting. For more information visit the Academy's website at: <http://www.vacadsci.org/>

3. Natural Area Preserve Brochure

The Virginia Department of Conservation and Recreation's Division of Natural Heritage has produced a brief (14 page) guide to 17 natural area preserves with public access facilities. The Virginia Natural Area Preserve System currently consists of 60 natural area preserves that protect 49,942 acres and nearly 600 occurrences of 375 exemplary natural communities and rare plant and animal species. To obtain a copy of the free guide call (804) 786-7951.

4. New Herpetological Books by Joe Mitchell

Joe Mitchell & Whit Gibbons. 2010. Salamanders of the Southeast. University of Georgia Press, Athens. 324 pp., 19 x 25.5 cm, more than 400 color photographs, 77 species distribution maps. ISBN 978-0-8203-3035-8 (paper; \$26.95).

Jeffrey C. Beane, Alvin L. Braswell, Joseph C. Mitchell, William M. Palmer, & Julian R. Harrison III. 2010. Amphibians and Reptiles of the Carolinas and Virginia. 2nd Edition. University of North Carolina Press, Chapel Hill. 288 pp., 14 x 21.5 cm, 221 color photographs, 172 species distribution maps. ISBN 978-0-8078-3374-2 (cloth; \$55.00); 978-0-8078-7112-6 (paper; \$25.00).

Joe Mitchell, cofounder of the Virginia Natural History Society, longtime coeditor of *Banisteria*, and a current honorary councilor, has coauthored two recent books of relevance to the amphibian and reptile fauna of the state.

The first book treats the 102 species of salamanders found in the southeastern United States. It is the final installment in the recent book series published by the University of Georgia Press aimed at both beginning and advanced naturalists that has treated all groups of amphibians and reptiles in this region.

The second book features 189 species of amphibians and reptiles, including 30 that were not discussed in the 1st edition (1980), which occur in Virginia, North Carolina, and South Carolina.

5. Proceedings of High-Elevation Forests Conference

Rentch, James S., & Thomas M. Schuler (eds.). 2010. Proceedings from the Conference on the Ecology and Management of High-Elevation Forests in the Central and Southern Appalachian Mountains. General Technical Report NRS-P-64. U.S. Department of Agriculture, Forest Service, Northern Research Station, Newtown Square, PA. 242 pp.

This volume includes 18 papers and 40 abstracts from a conference on the ecology and management of high-elevation forests in the central and southern Appalachian Mountains that was held in May 2009 in West Virginia. Topics covered include acid deposition and nutrient cycling, forest dynamics, ecological classification, birds, wildlife, and fisheries, forest pests, climate change, old-growth forest structure, regeneration, and restoration. Selected titles include "The Isolated Red Spruce Communities of Virginia and West Virginia," "The Current Status of Red Spruce in the Eastern United States: Distribution, Population Trends, and Environmental Drivers," "Historical Reconstructions of High-Elevation Spruce Forests in the Appalachian Mountains," "Area Occupancy and Detection Probabilities of the Virginia Northern Flying Squirrel (*Glaucomys sabrinus fuscus*) Using Nest-Box Surveys," "Predicting Climate Change Extirpation Risk for Central and Southern Appalachian Forest Tree Species," and "Maintenance of Eastern Hemlock Forests: Factors Associated with Hemlock Vulnerability to Hemlock Woolly Adelgid." Abstracts of direct relevance to Virginia include "American Chestnut Persistence in Southwestern Virginia 80 Years after Chestnut Blight Introduction," "Bird Conservation Issues in High-Elevation (Red Spruce-Fraser Fir-Northern Hardwood) Forests of the Southern Blue Ridge," "Species Distribution and Richness Patterns of Avian Communities in the High-Elevation Forests of Virginia," "Mapping the Current and Potential Distribution of Red Spruce in Virginia: Implications for the Restoration of Degraded High-Elevation Habitat," and "Potential Impacts of Climate Change on Bird and Tree Habitats within the Appalachian Mountains."

The disproportionate number of abstracts compared to full papers, and the limited treatment of non-avian animals (2 of 4 papers and 10 of 12 abstracts on vertebrates concern birds and the only papers on invertebrates pertain to exotic pest species), are about the only disappointing features of this otherwise valuable contribution. A pdf version of the entire proceedings volume can be downloaded from this website: <http://www.treesearch.fs.fed.us/pubs/36047>. Copies are also available from the Forest Service.

Virginia Natural History Society
Website: va-nhs.org

General Information

The Virginia Natural History Society (VNHS) was formed in 1992 to bring together persons interested in the natural history of the Commonwealth of Virginia. The VNHS defines natural history in a broad sense, from the study of plants, animals, and other organisms to the geology and ecology of the state, to the natural history of the native people who inhabit it. The goals of the VNHS are to promote research on the natural history of Virginia, educate the citizens of the Commonwealth on natural history topics, and to encourage the conservation of natural resources. Dissemination of natural history information occurs through publication of the journal *Banisteria*, named for John Banister (1650-1692) who was the first university-trained naturalist to work in Virginia. The first issue was published in 1992, and the journal is published twice per year in spring and fall. Articles cover a wide array of subjects, and prospective authors are encouraged to submit manuscripts on any aspect of natural history in Virginia; book reviews and biographies of relevance to natural history in Virginia are also welcomed. The editor of *Banisteria* will also consider manuscripts on any aspect of natural history from neighboring states if the information concerns a species native to Virginia or the topic is directly related to regional archaeology, anthropology, botany, ecology, zoology, paleontology, geology, geography, or climatology. Manuscripts are peer-reviewed for suitability and edited for inclusion in the journal. Page charges (\$15/page) are waived for VNHS members. The society's website contains instructions for authors, the titles (and abstracts beginning in 2004) of all *Banisteria* papers, and downloadable versions (PDF format) of numerous articles from past years.

Memberships

The VNHS is open to anyone with an interest in natural history and welcomes participation by all members in society activities and efforts to promote education and conservation. Membership includes a subscription to *Banisteria* and invitations to periodic symposia and BioBlitz surveys. Annual dues for members are \$20 (per calendar year); library subscriptions are \$40 per year. Checks should be sent to the Secretary/Treasurer, who also has back issues of *Banisteria* available at \$10.00 each (except Nos. 1-6 are \$5.00 and No. 13 is \$18.00). The VNHS is a tax-exempt, nonprofit, society under Section 501(C)3 of the IRS. We welcome donations to support our mission in Virginia.

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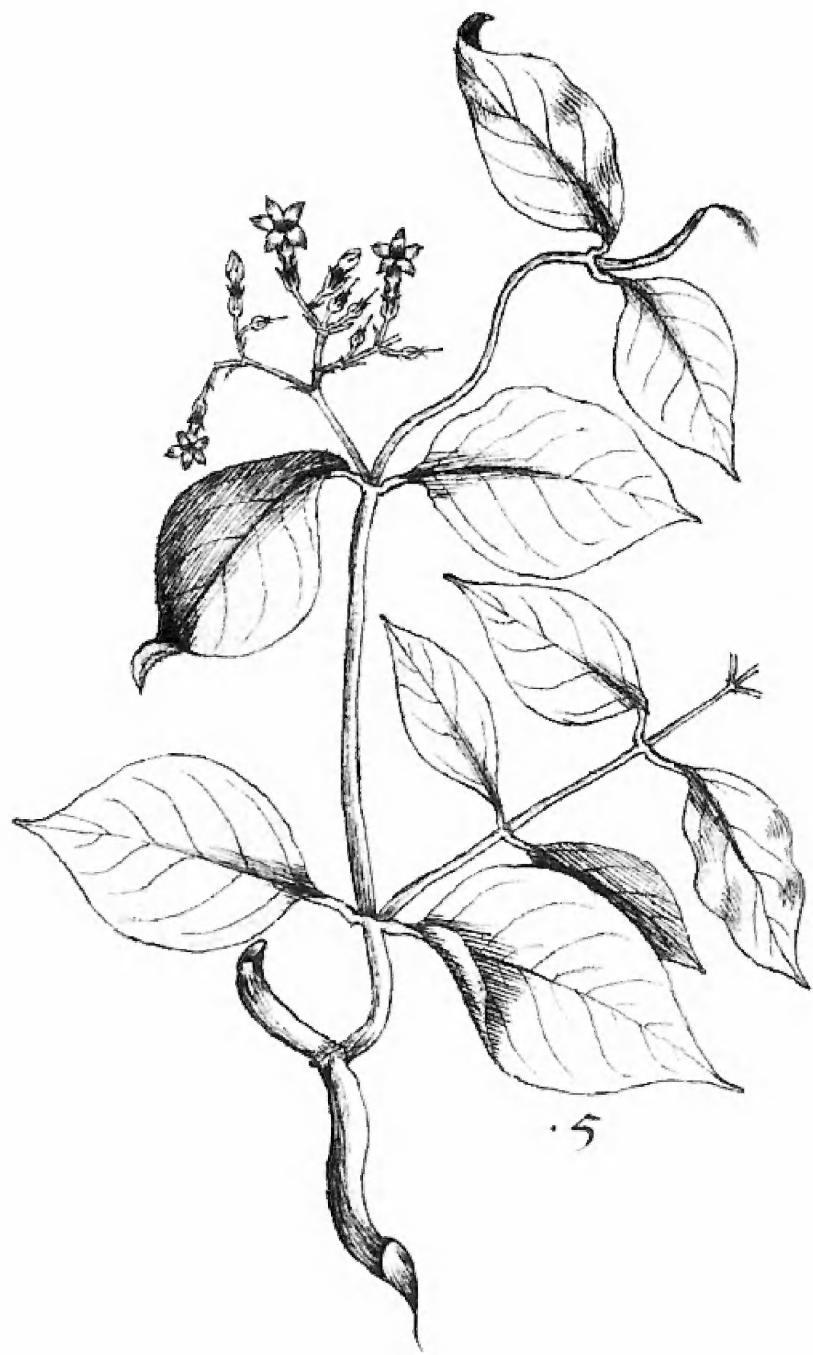
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• 5